The Mining Journal

LONDON, AUGUST 22, 1958

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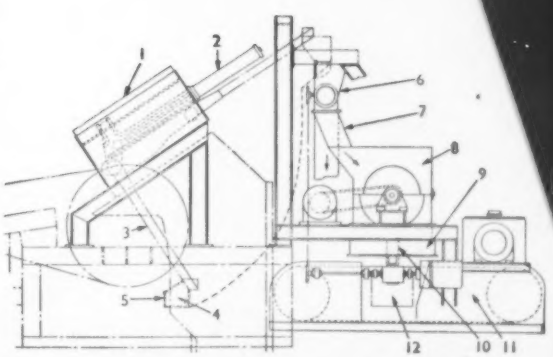

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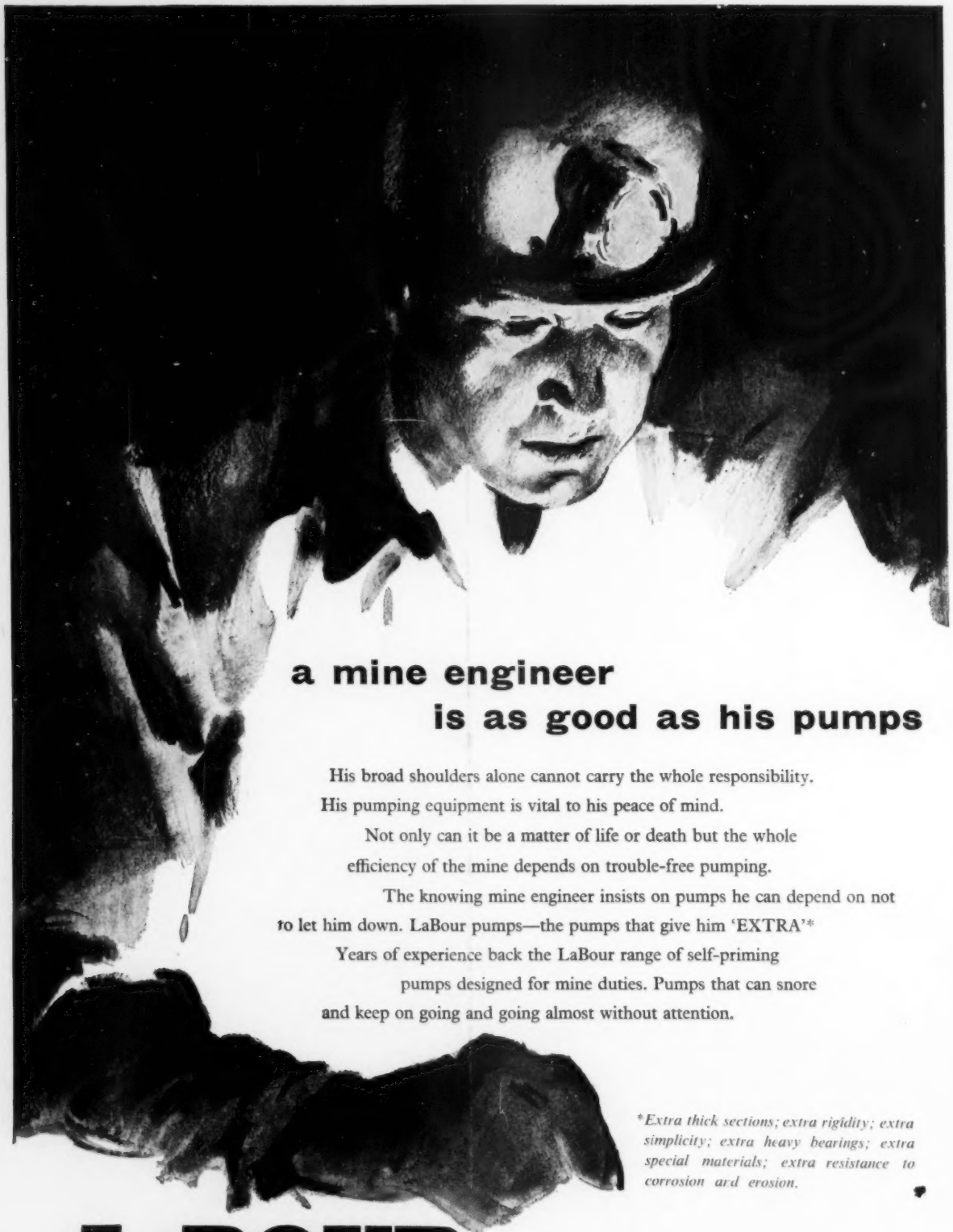

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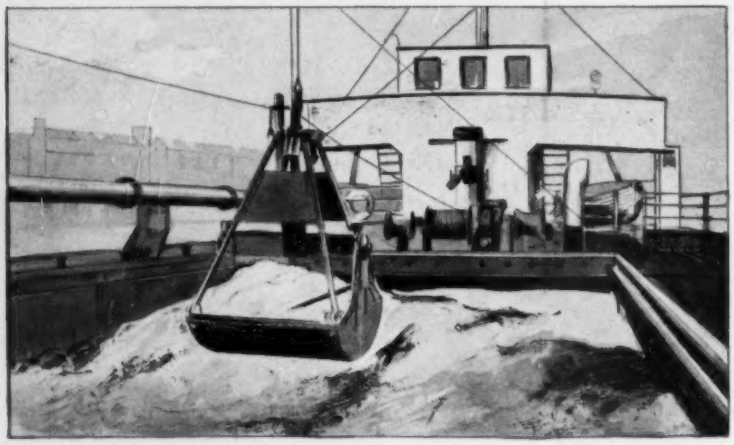

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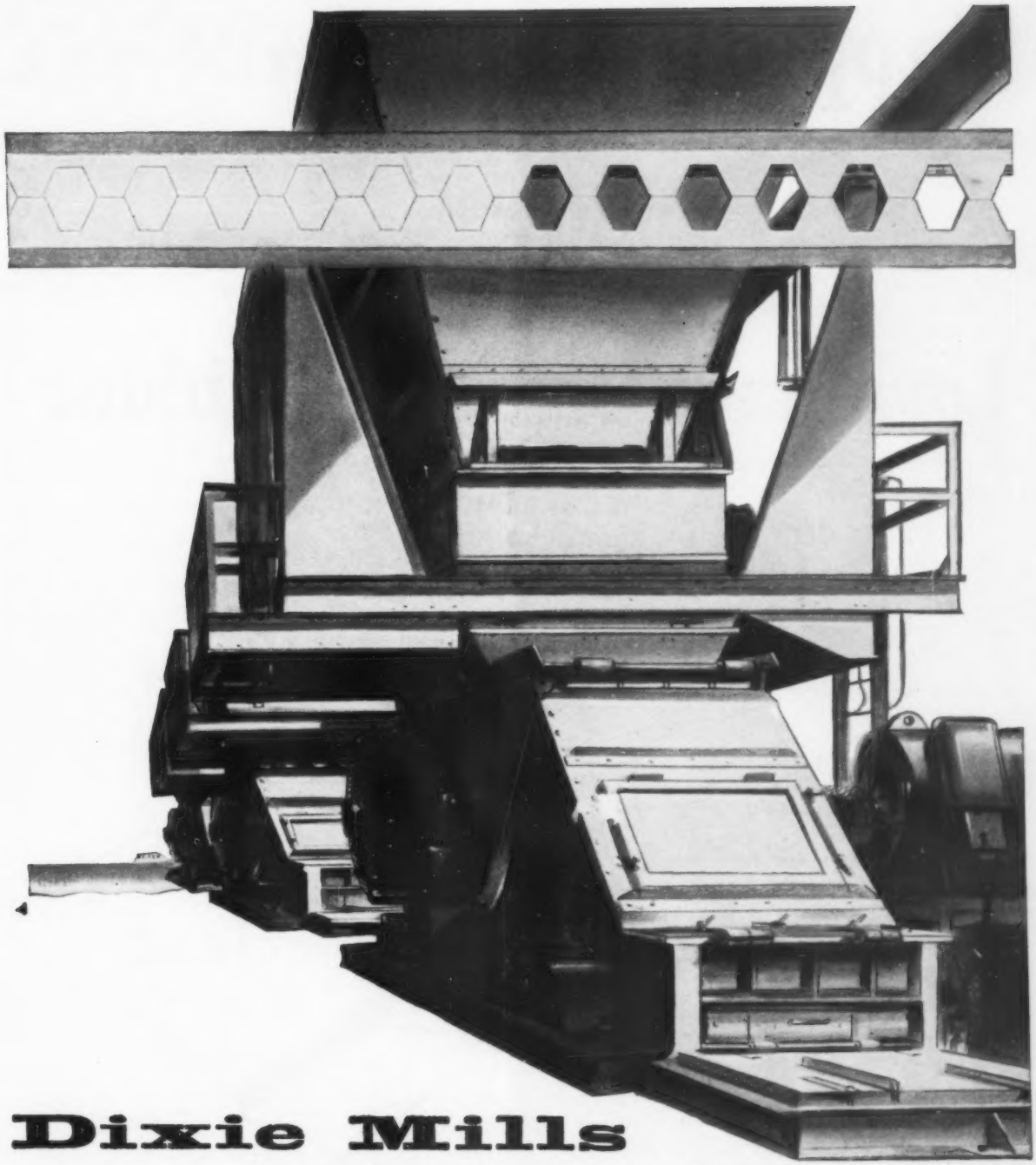

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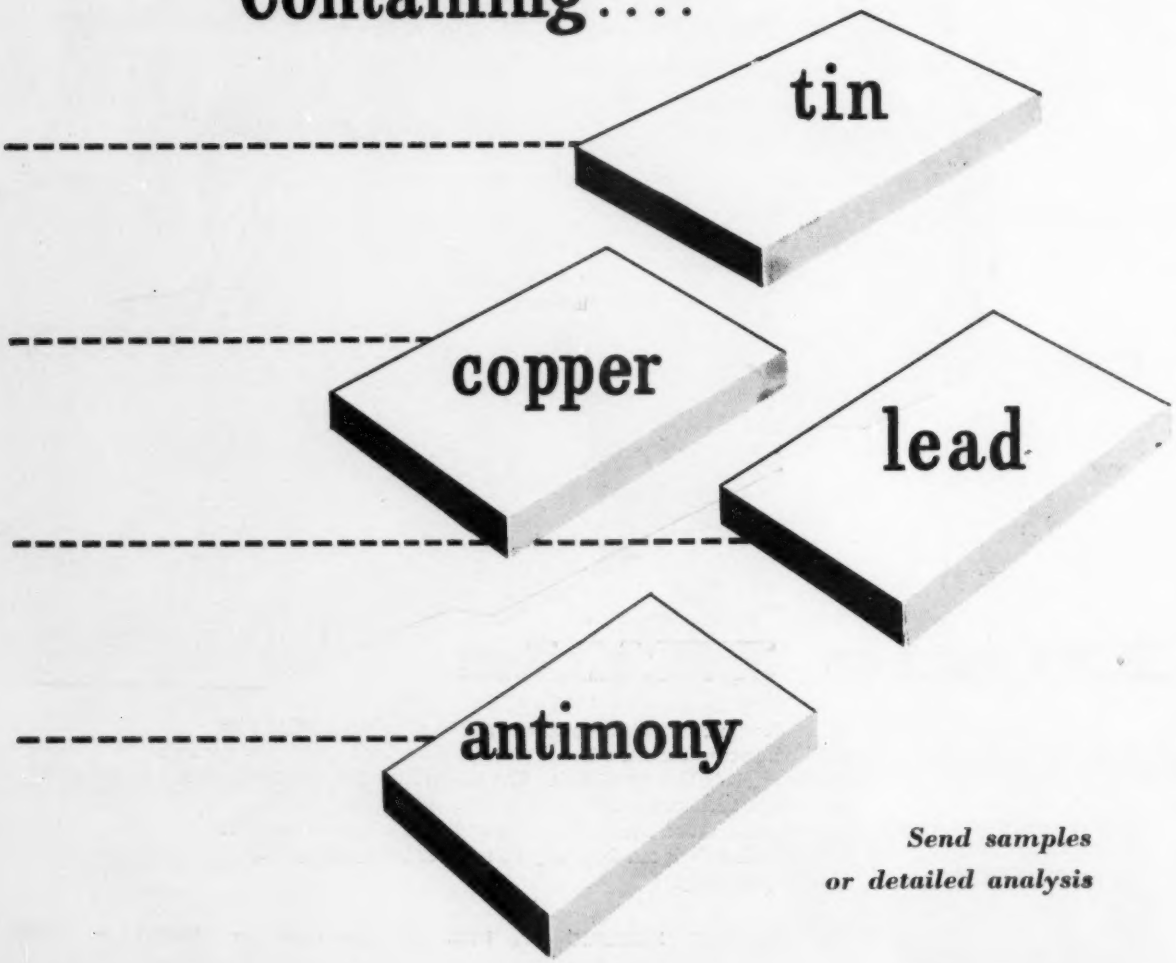

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The Mining Journal

London, August 22, 1958

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More Freedom for East-West Trade

THERE is general, if qualified, satisfaction in most Free World countries at the removal of a large number of items from the Soviet bloc and China embargo list. The relaxations, which are by no means inconsiderable, eliminate obstacles to the development of trading relations between Western Europe and the Communist countries. Though it by no means follows that trade expansion will automatically take place, Western industry is presented with potential markets which are particularly welcome at a time when there is widespread anxiety as to the possible repercussions on other Free World countries of the recession from which America now shows signs of emerging.

In principle, the lifting of outdated restrictions is wholly desirable, since it contributes to the elimination of those bottlenecks which are bedevilling international trade and depriving the peoples of the world of the full benefits of technological advances.

It is open to question whether, on balance, the embargo list has not been less harmful to the Communist bloc than to the countries whose interests it was designed to protect. In many instances, the most significant effect has been to stimulate the construction of plant and equipment behind the Iron Curtain, resulting in the permanent loss of what could have been valuable markets for Western manufacturers. The pill has scarcely been sweetened by the fact that, in many instances, short cuts to the development of new industries were taken by copying Western designs, with the result that today, British manufacturers are faced with competition in export markets from machines whose ancestry could be traced to their own drawing-boards. In the present state of Russian technological knowledge, the delusion that the Communist countries can be more than temporarily inconvenienced by withholding supplies of items other than certain raw materials becomes even more unrealistic.

While we should be duly grateful for mercies which are by no means small, it will not have escaped notice that even the revised list is large enough to occupy some seven pages of the *Board of Trade Journal* (of August 15, 1958). Metals and minerals which are still embargoed include, *inter alia*, boron, lithium, mercury, molybdenum, thorium, titanium, uranium, and zirconium, as well as ores and concentrates of beryllium, cobalt, nickel, niobium, and tantalum, and a number of alloys.

As had been generally expected, the export of aluminium and copper in all forms is now freed from COCOM restrictions. So far as aluminium is concerned, however, it is only too obvious from the extent of Communist offerings in European markets that the export of primary metal from the West to Russia would be equivalent to the shipment of coal to Newcastle in days of yore. Nevertheless, there might be openings for the export of aluminium in processed form, which could absorb useful quantities of Western metal.

Trade in copper, which has hitherto been restricted to a quota of copper wire, may be expected to grow, now that all forms of copper have been freed. Russian enquiry was reported on the London Metal Exchange, following the lifting of restrictions on

shipments, but it is not known whether any orders were actually placed. Reports from Santiago regarding recent talks on possible sales of Chilean copper wire to the Soviet Union have been conflicting, but a few days ago it was stated that the Soviet Union was willing to buy 20,000 tons of Chilean copper wire. It is possible, however, that the U.S.S.R. might in future prefer to buy copper for manufacture into wire in Russian plants. It remains to be seen whether Russia will become an important buyer of Chilean primary metal, bearing in mind that Russian production of copper is estimated by the British Bureau of Non-Ferrous Metal Statistics at 497,863 tonnes, an output exceeded only by that of the U.S.A. It is, of course, conceivable that to meet its expanding requirements the Soviet bloc might be obliged to purchase increasing quantities of Free World copper, whether in primary or processed form.

Greater freedom is also accorded to nickel, inasmuch as unwrought forms have been removed from the embargoed list, but nickel-based alloys containing 32 per cent or more of nickel and certain alloy steels are still restricted.

British exporters of mining machinery and equipment will benefit from the relaxations which include most vacuum pumps, oil well drilling and exploration equipment (except rotary drills) spectrographs and spectrometers (other than mass spectrographs and mass spectrometers), all vehicles other than those built to military specifications, most types of compressors and blowers, electrical generating machinery and electrical motors, and almost all industrial types of ball and roller bearings. On the other hand, goods still subject to embargo include various types of chemical and metallurgical plant, ranging from centrifugal counter-current solvent extractors specially designed for the extraction of radioactive substances, to plant for the manufacture of titanium and zirconium metal.

The revised list applies to the Soviet Union, Albania, Bulgaria, China, Czechoslovakia, Hungary, North Korea, North Vietnam, Poland, Romania, the Soviet Zone of Germany, and Tibet.

It is to China in particular that the thoughts of many British exporters are likely to be turning at the present time, for in this vast country with its immense and varied mineral resources, exploration and mining development are proceeding with rapidly increasing momentum and on a scale which even Canada can scarcely surpass. At this stage of her industrial development China must look to other countries for many requirements of her expanding mining and metal industries. Assuming — as seems logically indicated — that she is genuinely interested in placing orders for British equipment, the new trading opportunities presented by the revision of embargoes should be well worth following up.

JOBS IN DISPUTE

In the field of labour relations the mining companies in Northern Rhodesia are in the unenviable position of having to reconcile the seemingly irreconcilable viewpoints of the European and African Unions. Sometimes it must seem to them that, like Paris in Greek mythology, whatever judgment they give is liable to lead to war.

The latest apple of discord is presented by the Anglo American group's decision to employ operators instead of artisans on 38 jobs, as provided for in the agreement of April 29. This led to accusations of " deliberate attacks regarding demarcation between artisans and operators ", and on August 8, 500 workers decided to impose a ban on overtime by all daily-paid white workers at the Nkana mine. Nchanga miners followed this lead. Notices were also posted at all Copperbelt mines calling on members of the European Union to refuse to do any of the 38 jobs so far in dispute.

Fortunately second — and wiser — thoughts led to the postponing of the ban and to a meeting last Tuesday, at which it was agreed that full negotiations should begin on August 23.

In view of the relatively low price of copper it is scarcely surprising that in their search for economy the mining companies should be looking more closely at the many relatively unskilled operations reserved for skilled artisans at appropriate pay rates. Equally understandably, the low copper price and the consequent reduction of bonuses have made the European workers still more sensitive to changes that offer any threat, whether real or fancied, to their security. In this case they have little to gain by attempting to perpetuate a restrictive practice for which there appears to be no valid justification, particularly at a time when the danger of unemployment is virtually non-existent.

The reduced price of copper makes it more necessary than ever that all labour—both African and European—should co-operate with the mining companies in achieving maximum mining economies for the common good. It would seem that this point is appreciated by many members of the European Union, and prospects for a settlement of the labour troubles seem by no means unpropitious.

MOUNT ISA AND NUCLEAR POWER

The possibility of building a nuclear power station at Mount Isa has important national implications for Australia. The development of large mining projects in remote regions elsewhere might follow; for instance, the Weipa aluminium project on the Cape York Peninsula. The experience such a scheme would provide for local industry in the construction and operation of nuclear plants, and the supply of materials and components, should also be taken into account. These points recently were put forward by R. L. Crivelli, commercial manager of the Australian Atomic Energy Commission.

If the contemporary design of a nuclear power station is to be economic, it must have a large capacity and operate on a high-load factor. The advantages of the modern coal-burning plant in Australia's industrialized areas are great, especially where large base load stations can be accommodated in the power system. Both the capital cost and the unit cost of electricity produced is less than that of the nuclear station.

But the nuclear station is excellently suited to an isolated mining centre like Mount Isa, where there is an expanding mining operation, with an assured life amply sufficient to amortize the capital investment. As the plant operates three shifts every day, except two, in the year, the demand is high and constant. The load factor is 75 per cent to 80 per cent.

Power costs based on coal are unusually high because of the transportation problem at Mount Isa, accounting for 12s. per ton of ore treated. A steady increase in production is aimed at in the future, over a period of years. The present capacity is 27½ MW., composed of three 5 MW. generators, and one of 12½ MW., all coal-fired. A new 30 MW. coal station is being constructed and will be working in two years' time.

Some 70,000 tons of coal a year are required at the plant. The coal is fetched from Collinsville on the coast over approximately 700 miles of railway. The railway is already unsuitable for the traffic, now that the Mary Kathleen uranium plant is being built between Mount Isa and Cloncurry. Considerable work needs to be done on the railway

west of Townsville, involving relaying of lines to carry heavier goods, installation of extra equipment and sidings, purchase of locomotives, rolling stock, etc. But even with an improved railway system and the provision of new generating plant, the unit cost of electricity would fall very little below 2d. The possibility of using oil fuel has been considered, but it has no economical advantage over coal. It would also be neither economically sound nor technically practicable to build a transmission line from the coast.

Once a nuclear plant has been built at Mount Isa it would need only 50 or 60 tons of uranium a year instead of hundreds of thousands of tons of coal.

In deciding whether a nuclear plant for Mount Isa would be economically practicable it has to be borne in mind that the only system that can be regarded as proved in operation today is the British gas-cooled graphite moderated reactor using natural uranium. However, the natural uranium system involves a relatively large reactor and, therefore, will only be economical for a fairly large station. 60 MW. is probably the economic minimum and 120 MW. gives substantially better results. Some conventional standby capacity would doubtless be regarded as advantageous.

The course of base metal prices will have a strong effect on the timing of the expansion programme which is a matter of company policy. The following table of installed capacity may be taken as an illustration of the company's growing power requirements :

Period	Capacity MW.
A	27.5
B	57.5
C	60 plus standby capacity
D	90 " " "
E	130 " " "

Different schemes might be adopted to meet these needs, being various combinations of coal and nuclear plant. To illustrate, it might be assumed that a large station of 60 MW. would be brought into operation in Period C, capable of expansion to 120 MW. later. The approximate total capital cost (excluding fuel) would be £18,750,000, but in the first stage £2,500,000 less would need to be spent making the cost in Period C £16,250,000.

The first three nuclear stations being constructed in the U.K. for the commercial production of electricity are progressing, and it is expected that the next contracts to be let for the building of other stations will result in a marked improvement in efficiency. Mount Isa would benefit from this advance.

Such a spectacular reduction in power costs would be significant nationally. It would enable a reduction to be made in the ore cut-off grade, so that a large quantity of ore at present not worth treating could be profitably mined. In this way, according to the Department of National Development estimate, the value of metals from the ore which would be saved would total many millions of pounds.

EIRE'S COAL OUTPUT RISES

Between 1956 and 1957, according to statistics issued by the Department of Industry and Commerce in the Irish Republic on August 2, the production of anthracite from Irish mines increased from 135,000 tons to 150,000 tons. The production of semi-bituminous coal rose from 60,000 tons to 80,000 tons.

The Department states that increased production has been encouraged by the various tax concessions on coal mining and by the assurance of a ready market for all native Irish coal produced. Increasing quantities of native Irish coal are being used in the production of electricity, sugar, cement, etc. There will be a further increase when the new power station situated near the Arigna Coalfield in County Leitrim comes into operation in September.

Since the total annual requirements of coal in Ireland are in the region of 1,400,000 tonnes, there is ample room for the expansion of native coal production. A three-year survey of coal deposits is now under way. Drilling contractors have been invited to tender for the diamond drilling operations in the exploration of the Leinster coalfields.

TRADITION HANGS BY A THIN THREAD

International screw thread standards, for long a nuisance owing to the differences existing in these standards as between country and country, were once more granted the limelight when the problem was discussed at the Fourth Plenary Session of the International Standards Organization during June this year. The Session, held at Harrogate and attended by delegates from 38 countries, provided an opportunity for further discussions on international screw thread standards, and it was agreed to recommend to the I.S.O. Council that there should be two internationally recognized screw thread systems. These, it was suggested should be the unified inch series of threads, the use of which is already widely established wherever the decimal inch is the standard engineering unit of measurement, and the newly agreed metric series of pitch diameter combinations. This latter system is to be adopted by " metric countries " though as yet it exists only on paper.

A feature of the screw thread discussions at Harrogate was the wealth of evidence submitted by the American and Canadian delegations to show that in both countries Unified Screw Threads have completely superseded the older American National Coarse and the American National Fine series. Industries seeking sales in North America will certainly benefit if they adopt unified threads in any equipment they may have to offer.

COMMUNITY CREDITS

Allocation of the $50,000,000 loan recently floated in the U.S. capital market has been announced by the High Authority of the European Coal and Steel Community. The speed at which this loan was subscribed is indicative of the healthy state of Community affairs. The loan is to be used for 28 major projects; the lion's share going to the coal industries of the six Pool countries. The allocations are $28,000,000 to the coal industry, $19,000,000 to the steel industry and the remainder to develop the iron ore mining industry.

The money is to be used to modernize and develop coal-producing installations, for expansion of iron ore production, development of pig-iron production in coastal plants, and for the improvement of steelworks for the dressing and direct reduction of iron ore. German enterprises are to receive $28,000,000, French enterprises $13,500,000 and Italian and Belgian enterprises $8,500,000. Of the 28 credits granted, 25 totalling $45,000,000 are for 20 years at 5⅛ per cent interest and 3 credits are for 5 years at 5 per per cent interest.

Applications by enterprises within the Community for a share of the funds totalled almost six times the amount available.

FROTH FLOTATION—I

Frothing and Collecting Agents in Tin Ore Dressing

It is now about thirty years since flotation was introduced as part of tin-dressing operations, and a great many advances have taken place, although there is still much to be learned about the physical chemistry of surface interactions and the mechanism of such aspects as slime coating. Although a great deal of fundamental work has been accomplished and many routine investigations on the flotation of a large number of ore types, including many non-metallic minerals, has been completed, little attention has been given to the removal of pyrite and other sulphides and sulpharsenides from tin ore concentrates. The following article, the first of two parts, was recently presented as a paper to the Cornish Institute of Engineers.

IN applying flotation to the treatment of tin ores, the problem is quite different from the normal operation. First, it is imperative that a very high recovery of the sulphide and arsenide minerals is made in the float; a recovery of, say, 95 per cent which might be considered reasonable when aiming at recovering arsenopyrite from an ore is insufficient. This can be clearly seen from the following—let us suppose that the gravity concentrate contains 10 per cent arsenopyrite and 95 per cent is removed —the remaining 5 per cent will represent a value of about 0.6 per cent of FeAsS or equivalent to some 0.26 per cent As.

Second, the particle size must not be reduced excessively to provide a suitable feed for flotation because in so doing, there is a danger of producing very fine or "slime" cassiterite which not only causes greater losses in flotation but is also difficult to recover in any subsequent gravity treatment. Other factors are that the sulphide concentrate must be very clean, as if it contains entangled extraneous material it will carry an excessive amount of tin. There will be a tendency towards instability in the flotation cells as all colloidal material is removed in the prior gravity concentration. Finally, oxidation during the gravity treatment or the presence of "slime coating" may inhibit flotation of some of the sulphide minerals.

The usual practice in Cornwall and some mines elsewhere has been to employ batch flotation rather than a continuous operation. This policy has been dictated by three considerations in the main, namely, the need for a very high recovery which can be more readily controlled in a batch operation, the fact that the feed is comparatively coarse and the suspension of particles is relatively unstable due to the absence of "slime", which may tend to cause "sanding-up" in the passages between cells, and lastly, the relatively small quantity to be treated which requires small cell volume for continuous operation involving greater difficulty in control.

On the other hand, batch flotation consumes more labour and, therefore, has a higher operating cost (but this depends on the degree of mechanization in loading the cells and if any attendance is required on the continual process, the difference may be small). The initial cost for batch flotation is lower at the tonnage usually handled.

If the material is fast floating, for example ores which contain chalcopyrite and some pyrite but rarely arsenopyrite, certain copper minerals and some pyrite, and if the particle size is not too great, it may be quite satisfactory to employ continuous flotation such as is used at Rooiberg in the Transvaal or at the Hydraulic Tin Co. at Bissoe.

In such an arrangement a stock tank, some feed regulation and a conditioner must be provided as well as the actual cells. It is also necessary to clean the float, probably more than once, in order to lower the tin content in the reject to an acceptable level. At Geevor mine a combination of batch and continuous flotation is used. This plant is so arranged that it is operated by one man as all loading is automatic, froth removal is mechanical and only the reagents have to be added manually to the batch cells.

Some difficulty was first experienced with the froth removal by the usual rotating blades as the froth is heavy but shallow and the normal arrangement tended to dig deeply and splash. This was overcome by an ingenious device whereby the blades are enabled to describe a path which more nearly approaches a straight line rather than an arc of a circle.

At this mine it has been found that some of the chalcopyrite encloses cassiterite and in order to reduce the tin loss in the float, it is necessary to grind the float before re-treatment. Such grinding also encourages stability in the cleaner circuit.

The removal of coarse particles by table-flotation can be done effectively so that only material of a particle size which floats readily is treated by froth flotation. It may be interesting to note in passing, however, that the tin loss in the table-flotation reject is always lower than in the froth flotation material.

Let us now consider some of the many variables which are encountered, the following observations being the outcome of research over the past three years at the Camborne School of Mines.

Type of Frothing Agent

In order to determine the effect of various frothing agents, a series of investigations were undertaken using a synthetic sample comprising a mixture of 25 per cent cassiterite, 30 per cent pyrite and 45 per cent silica which was ground to pass 60 mesh B.S.

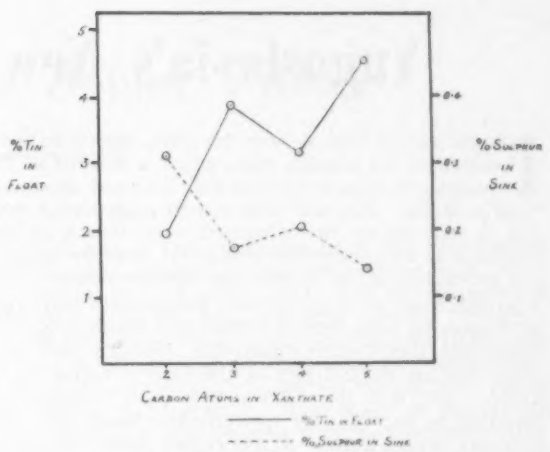
In each case additions of sulphuric acid and ethyl xanthate were at a concentration of O.5 ml. per litre and 70 mg. per litre respectively. The various frothing agents were added using 100 mg. per litre and conditioned for ten minutes followed by addition of water and froth removal for ten minutes. 100 grm. was used in each test and the W/S ratio was kept constant throughout.

	Float No. 1			Float No. 2				Summary		
Variable	*wt %*	*Assay*	*% dist*	*wt %*	*Assay*	*% dist*	*sink %*	*Tin loss (1)*	*Tin loss (2)*	*Total*
Pine oil	14.4	1.8	1.4	8.0	9.8	4.26	77.6	1 4	4.26	5.66
Dowfroth ...	12.9	1.0	0.72	5.1	5.75	1.64	82.0	0.72	1.64	2.36
T.E.B.	16.8	0.7	0.66	6.6	7.7	2.83	76.6	0.66	2.83	3.49
W	24.4	7.7	10.42	2.3	9.3	1.19	73.3	10.42	1.19	11.61
T.E.B. no acid ...	10.3	5.5	3.15	6.9	9.7	3.17	82.8	3.15	3.17	6.32

These results indicate that a frother such as "W" is inclined to pull tin in the froth. They also indicate that the newer synthetic frothers are considerably more powerful. Some fail to pull the larger particles of pyrite but a mixture with some pine oil produces an excellent froth and a fairly low tin content. From this it would appear that such a frother as Dowfroth should be seriously considered to loosen the froth when finely divided cassiterite is present.

It was next thought desirable to ascertain the influence of individual frothers on the cassiterite in a sample when no sulphide was present and a mixture of 25 per cent cassiterite and 75 per cent silica was prepared. Again the same reagents were used but after the initial ten minutes' frothing, amyl xanthate amounting to 50 mg. per litre was added and the froth removed for another five minutes. These results are shown in the table.

From these results it can be seen that (a) Dowfroth is probably the best as there is a low tin loss, (b) TEB is a good second, (c) W pulls tin badly. It is also clear that the cassiterite is floated with amyl xanthate whilst if no acid is used, cassiterite tends to float very readily. It has been found, furthermore, that using Geevor ore, Dowfroth reduces the tin loss from 1.95 per cent Sn to 1.3 per cent Sn but the sulphur content of the sink is increased from 0.309 per cent to 0.515 per cent. When a mixture of Dowfroth and Pine oil was used, however, the loss was 1.75 per cent and the sink carried 0.275 per cent sulphur.



Tests on a concentrate from Geevor

Effect of Non-Polar Additives

A similar series of experiments indicated that petroleum fuel oil improved results but that emulsions had very little effect. Similarly, creosote improves the recovery of tarnished sulphide but the effect of adding as an emulsion was not very apparent.

The tendency of this reagent is to increase the tin loss but improve the recovery of the sulphide minerals and if one reads the results carefully it would appear that a cationic emulsifying agent or a trace of fatty acid may be most satisfactory. More work is needed on this problem.

By F. B. MICHELL

The ease with which cassiterite floats leads one to think that there is some adsorption by xanthates and, indeed, Pryor has shown that with suitable sulphidizing it can be made to float with a higher xanthate. Again, our investigations are not complete but the indications are that cassiterites vary a great deal in their floatability. Using a concentration of 100 mg. per litre of ethyl xanthate we have found that most cassiterites exhibit a tendency to float especially at a pH above 8. Furthermore, the higher xanthates are more effective in producing flotation, whilst in the presence of 100 mg. per litre of copper sulphate the cassiterite floats more readily at both pH 3 and at pH 8.

Although to date no less than 80 different tests have been carried out, the conclusions are not very obvious—but we have been led to conclude that magnetic cassiterite from Nigeria is not floated appreciably. The effect of copper sulphate is interesting in that it may be used as an activator for arsenopyrite and furthermore, the presence of copper minerals (particularly if oxidized) in an acid circuit must contribute copper ions to the flotation pulp, and it might be expected to increase the tin loss in consequence. This is certainly borne out by the observation that at Wheal Kitty and Polhigey the tin loss in flotation was lower than at Porkellis or Geevor where copper minerals are present in relatively large amounts.

It will be interesting to see what effects sequestering agents may have on the tin loss in such cases, as these are now available in commercial quantities but, unfortunately, these sequestering or chelating compounds which are available are not very effective at the low pH values usually employed in tin dressing.

Influence of Xanthate Type

It is well known that the higher xanthates are more powerful and are more readily sorbed on tarnished minerals. For example, chalcopyrite and bornite float with ethyl xanthate but chalcocite is less floatable and may require iso-propyl or butyl xanthate, while arsenopyrite may need the amyl compound.

The use of Minerec should be tried in Cornwall but I do not think it is available in this country. (Aerofloats give good results on copper minerals and Reagent 208 is used for native copper but, unfortunately, many of the aerofloats produce a greater tin loss—there is room for experiment with some of the solid reagents such as 208 and 238 nevertheless.)

Recently G. Erberich has shown (in a paper read at the I.M.D.C. Stockholm, 1957) that the action of xanthates does not increase with the length of the carbon chain in commercial products. In the case of pyrite, the shorter chain compounds appear more effective.

Tests carried out using a concentrate from Geevor Mine indicate that the tin loss does not follow the number of carbon atoms present whilst the sulphur content does not fall progressively with the length of the carbon chain.

It is not clear why the tin loss falls off with butyl xanthate but it may be that the quickest flotation of the mixed sulphides takes place with this reagent.

If butyl xanthate is the best all-round collector, taking into account the arsenopyrite and chalcocite, then it would account for the drop in the cassiterite content.

Xanthate surfaces are liable to oxidation but it has been shown that copper ions prevent the destruction of the surface, and alcohols as well as alkyl metyl ammonium salts stabilize the xanthate surface against oxidation, and in some cases small amounts might be useful.

Yugoslavia's New Lead-Zinc Producer

IN the second half of June this year, operations were started at the Kiznica mine, which is situated in the vicinity of Yugoslavia's greatest lead-zinc producer, Trepca, Serbia. The new mine started production a year and a half before the scheduled date, thanks to the assistance in its construction which was given by workers and technicians of the Trepca and Ajvalija mines.

Kiznica's rich ore resources were known many years ago, as is apparent from various manuscripts which originated before the 10th Century, when this important new producer was an integral part of the Janjevo mines. It is known, too, that the Kiznica ores were exploited in medieval Serbia, but with very primitive means and only to a very limited extent. At a later date, while other parts of Yugoslavia were in the power of the Turks and Austro-Hungarians, and during the existence of the kingdoms of Serbia and Yugoslavia, exploitation of this mine was completely neglected.

After World War II a start was again made with careful scientific investigation of the ore riches of this region. Prospecting carried out since 1952 has shown that Kiznica possesses such an abundance of mineral wealth that it may soon succeed the Trepca mine.

Initially, mining will not be undertaken in all of the sections which are now being prepared for exploitation and output will amount to some 200 tonnes of rich lead and zinc ore daily. By the middle of next year the production of high-quality ore should be increased to 500 tonnes daily, thus fully keeping pace with the programme set out in the prospective plan for Yugoslavia's economic development during the period 1957-1961, in which it was envisaged that production would be started in 1960 at a rate equivalent to about 50 per cent of the current output of lead-zinc ore at Trepca.

It is anticipated that the first year's operations will yield about 7,000 tonnes of lead, 1,600 tonnes of zinc, 7,000 kg. of silver, and 32 tonnes of pyrites.

Known ore reserves are currently estimated at about 3,000,000 tonnes, sufficient to maintain an annual production of 150,000 tonnes for 20 years. In addition, geological investigation has indicated about 7,000,000 tonnes of ore of rather lower quality, exploitation of which is planned for the second stage of production scheduled to begin after 1961. By then the output of this new mine will be in the region of 400,000 tonnes of ore a year. It should also be borne in mind that in the environs of the Kiznica mine there are still large areas which have not been thoroughly explored.

By Branko Djukic

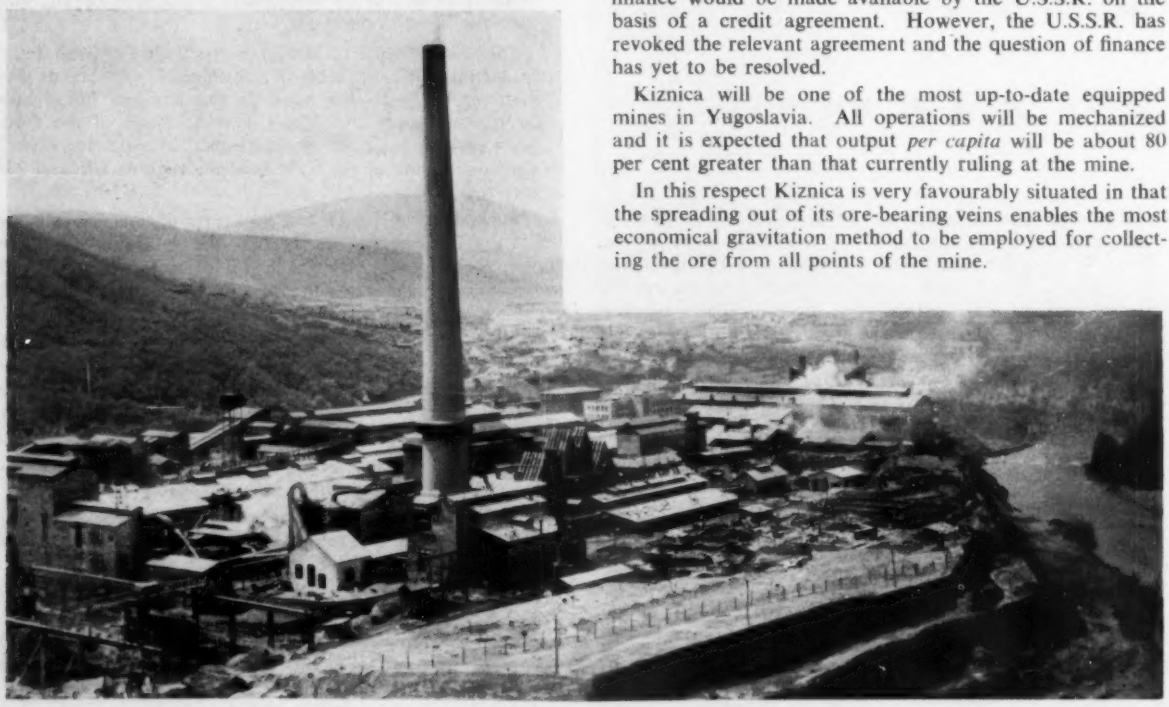
Financing will be carried out in two stages, involving expenditures of 3,000,000,000 and 140,000,000 dinars respectively.

Initially, ore from Kiznica will be transported for further treatment to Zvecan, which is one of the plants of the Trepca mine. However, to treat the eventual output of 400,000 tonnes annually, which has not yet been attained in any lead-zinc mine in Yugoslavia, it will be necessary to build a treatment plant, and this will result in a substantial decrease in transport costs. The prospective plan for the economic development of Yugoslavia in 1957-1961 foresees for this purpose the construction of a flotation plant at Badovac, near Pristina, the principal town in the Kosovo and Metohija district. It was expected that the required finance would be made available by the U.S.S.R. on the basis of a credit agreement. However, the U.S.S.R. has revoked the relevant agreement and the question of finance has yet to be resolved.

Kiznica will be one of the most up-to-date equipped mines in Yugoslavia. All operations will be mechanized and it is expected that output *per capita* will be about 80 per cent greater than that currently ruling at the mine.

In this respect Kiznica is very favourably situated in that the spreading out of its ore-bearing veins enables the most economical gravitation method to be employed for collecting the ore from all points of the mine.

The lead-zinc mine at Trepca, Serbia, Yugoslavia's greatest producer. The Kiznica property is in this vicinity



Aluminium in the Soviet Union

(From a Special Correspondent)

IN any country the development of the metal industries is a direct function of national power and the course of international power politics during the 20th century has been closely related to the availability of mineral resources and to mining development in different nations. Military aspirations and internal and foreign policies in general are automatically reflected in mining development.

This is no less true of the Soviet Union, and her mineral economics provide many clues to the policies of the Eastern bloc.

During the first ten months of 1957 the U.S.S.R. exported ores and metals valued at £15,000,000 to the United Kingdom, much of this trade taking place in the latter half of the year.

The entry of the U.S.S.R. into world metal markets on a considerable scale has come as a shock to many of the main Western producers and there have been suggestions that this is the vanguard of an intensive onslaught designed at wrecking Western economy. Russian leaders have on numerous occasions given utterance to this concept of economy-wrecking and have claimed that the West need have no fear of Russia extending her influence in the West by conquest when the Soviet is sure of eventual triumph over capitalist nations in the economic field.

The total Soviet metal exports to Britain last year did not constitute a major proportion of metal usage in this country, but these exports have been made at times and at prices which are embarrassing to a metal market undergoing a severe depression. If these exports represent a genuine exportable surplus of Russian metal output, and if the prices can be maintained, then this increased offering of Russian metal is certain to have a profound depressive effect on the Western non-ferrous metal industry.

A long-term Russian effort at undermining Western capitalist economy appears less fantastic at the present time than at any time since the war, when recently there have been striking revelations of advances in Soviet technology in other fields than metallurgy and when there has been a significant indication of how Russian resources can be rapidly mobilized and concentrated on a project. In the mineral field the development of the Yakutz diamond deposits illustrates the rapid and intensive development possible under the Soviet system.

There are other possible interpretations of the advent of the U.S.S.R. as a major exporter of non-ferrous metals besides the political.

Today, the U.S.S.R. is far from backward in industrial development of her undoubtedly vast resources or in realizing the possible prestige value in demonstrating to the uncommitted nations of the world Soviet competence to exploit these resources and the apparent ability to produce metal at a lower cost than the Western world. The availability of an exportable surplus may indicate or be intended to indicate that self-sufficiency in metals has been achieved by both the U.S.S.R. and her satellites and that parity with the West exists in the provision of military stockpiles of raw materials. On the other hand, the metals now being sold may represent stockpile disposals following a reassessment of the raw material demands of any future war similar to the recent policy revisions of Britain and America.

The export of Russian aluminium is the most striking example of the rapid increase in Anglo-Soviet trade. Russian exports of ingot to the U.K. in 1956 were insignificant and the price of this metal was high. During 1957 some 15,000 tons entered the U.K., representing over 10 per cent of the U.K. consumption. The price asked for Russian aluminium was considerably below the current rates ruling on Western metal markets. The ability to export this metal and at a favourable price provides a measure of the rapid growth of Soviet industry. It is possible to examine these exports in the context of the Soviet aluminium industry which, despite secrecy, is the branch of Russian nonferrous industry about which there is a fair amount of information in the West.

The Russian Aluminium Industry

Russia did not commence the manufacture of aluminium until 1932 and her pre-war production was insufficient for her peace-time needs. During the 1939-45 conflict, Soviet airpower suffered considerably as a result of the aluminium shortage, the deficiency eventually being met by Lease-Lend shipments. Since the war the Russian aluminium industry has been considerably expanded, first by the installation of reduction plant from the Russian zone of Germany and subsequently by the construction of new aluminium smelters.

The growth of the Russian aluminium industry has been severely hampered in the past by lack of bauxite reserves and the under-development of her hydro-electric power resources.

On the whole, bauxite occurrences in the U.S.S.R. have a low alumina content and the industry was originally based on the utilization of the Tikhvin bauxites containing 45 per cent Al_2O_3 and 10 per cent to 20 per cent silica. This is a shockingly low-grade bauxite by Western standards and gave rise to the poor recoveries experienced in early Russian aluminium plants. A better-grade bauxite occurs at Krasnaya-Shapochka containing 59 per cent Al_2O_3 and 4 per cent silica, although the Ivdd deposit developed in this area shows a wide variation in grade. Another good grade bauxite occurrence at Novaya Pristan seems to have been exhausted in recent years along with the Kukshinsk deposits whose grade is not known.

The Berd and Zhulanikha deposits in the Kuznetsk basin near Stalinsk are of fair grade but the reserves do not appear to be large. Apparently the Kamensk-Aoapavest, Volkov and Kolchedanokaye bauxites are again of low grade, probably of the order of 30 per cent Al_2O_3, and have a high silica content which reduces the available alumina in these ores to very low levels.

According to Mr. Krushchev, deposits of high-grade bauxite are being rapidly developed at Turgai in Kazakhstan and the discovery of further important deposits in a country the size of the Soviet Union cannot be discounted. At the present time, however, an appraisal of available information and various estimates leads to the conclusion that the U.S.S.R. possesses reserves of the order of 40,000,0000 tons of bauxite ranging in grade from fair to submarginal by Western standards.

The interest shown in the Soviet Union in producing aluminium from nepheline syenite and alunite deposits containing about 20 per cent Al_2O_3 indicates that she is far from over-endowed with good-grade bauxite deposits. The Achinsk smelter in Kazakhstan is reputed to utilize nepheline mined nearby and there have been frequent reports of the development of the nepheline deposits of the Kola peninsula. Whilst research into the extraction of aluminium from aluminous clays has been carried on for some time in the U.S.A., processes have so far proved uneconomic. A pilot plant operation of the Anaconda Co. is reported to have indicated that an economic operation is feasible, but the U.S.A. lacks the obvious incentive that has thrust the U.S.S.R. to the forefront in the treatment of low-grade aluminous materials, namely the lack of suitable bauxite deposits.

Despite the utilization of other aluminous materials the rapid growth of Russian aluminium production depends not on indigenous resources but on bauxite imported from her satellite nations. The foremost amongst these as regards bauxite resources is Hungary and the ruthlessness with which Soviet Russia resisted the Hungarian revolt from her domination may have found some inspiration in economic as well as political considerations.

Hungarian bauxite reserves are estimated to be of the order of 300,000,000 tons and much of this total is made up of high-grade material containing over 60 per cent Al_2O_3 and little silica. A deposit with reserves of about 200,000 tons of Harsany-Villay carries 68 per cent Al_2O_3 and 6 per cent silica, whilst the Verte deposit contains 120,000,000 tons of bauxite with 65 per cent alumina and a silica content of only 1 per cent. The Balcony deposits, the equal of Verte's in reserves, are lower in grade, carrying 46 per cent alumina and a high iron content. Precise details of these deposits are not available but the overburden is generally considerable, the Gant Mine operating on a bauxite deposit 30 ft. thick overlain by strata 75 to 120 ft. in thickness. Hungarian shipments of bauxite to Russia began in earnest in 1947 with the export of some 200,000 tons and by 1953 Hungary had exceeded the peak wartime output (of just over 1,000,000 tons during the German occupation of 1943), and mined 1,500,000 tons of bauxite, most of which is supposed to have found its way into Russia. Hungary also exports bauxite and alumina to Eastern Germany and Poland and to Czechoslovakia in return for electric power.

Romania is credited with reserves totalling 20,000,000 tons of bauxite for which grades of 57 per cent Al_2O_3 and 2 per cent silica have been reported.

Czechoslovakian and Polish bauxite resources do not appear to be significant.

China's deposits of bauxite and alunite are reputedly very large but information on the exploitation and possible export to Russia of Chinese ores is not available. China's own aluminium industry is now reported to be rapidly expanding.

Capacity of Russan Aluminium Plants

All Russian statistical data must be accepted with reservation, there being considerable conflict between figures released on different occasions and from different sources. Where production is reported in terms of a percentage increase over previous years there is the possibility of considerable cumulative errors and there is often confusion arising from alternative ways of reporting metal outputs in the East and West.

The Volkhov plant, 80 miles east of Leningrad, was originally constructed in 1932 with the aid of the French Péchiney concern and is thought to have a current capacity well over 50,000 tons annually, having been rebuilt after its destruction in World War II with equipment shipped from the Soviet Zone of Germany. An alumina plant at the same site uses Hungarian bauxite. The Zaporozhe plant on the Dnieper has a similar history and a larger capacity. Both plants are served by hydro-electric schemes. Kamensk-Uralsky is a large reduction plant, perhaps the largest in the U.S.S.R. It was originally served by a thermal power station fuelled with brown coal but is now thought to be served by a hydro-power project. Not much seems to be known of the other plants, most of which have been planned and constructed in the post-war years. The tendency has been to underestimate Soviet plant capacity and planned production figures exceed total plant capacity estimates.

The U.S.S.R. has recently reported the planned construction of an aluminium reduction plant which is to be the largest in the world. Production from this plant will, therefore, have to exceed that of the Arvida plant in Quebec which has a capacity of 362,000 s.tons annually.

On top of this has come the announcement that no fewer than 20 new aluminium plants are to be constructed in the Soviet Union. The U.S.A. has at present a total of over 20 aluminium smelters and 20 new Russian plants would seem to be rather ambitious.

Undoubtedly the Soviet Union is fast becoming second only to the United States in aluminium capacity and the present deferments of expansion programmes throughout the North American aluminium industry, if prolonged, could well see her established in this position.

Total 1957 aluminium production of the Soviet bloc is assumed to have been in excess of 700,000 tons and it has been predicted that 1961 production will be twice this quantity.

Power for Aluminium Production

Approximately 20,000 kWh. of electricity are required to produce a ton of aluminium and the cost of power may constitute 20 per cent of operating costs. One of the major components of total costs is depreciation and the large capital investment per ton aluminium plant capacity. In the U.S.S.R. the production of hydro-electric power has been rapidly developed and a number of hydro-projects have been completed in the last three or four years. Whilst only a small proportion of Soviet hydro-power had been harnessed by 1952, this form of electricity generation has now taken precedence over thermal power stations. Whilst in the U.S.A. thermal power generation is now undertaken for aluminium smelting as suitable hydro-power sites are exhausted, the Russian aluminium industry has been undergoing a conversion from thermal to hydro-electric power. Soviet electric power output was expected to reach 211,000,000,000 kWh. during 1957, indicating an installed capacity of over 60,000,000 kW. If this is so, power station capacity has been increasing at a rate of 5,000 MW. per annum since 1953.

The exploitable hydro-power reserves of the U.S.S.R. total 1,700,000,000,000 kWh. per annum, but the greater part of this power is in the Asian regions of Russia whilst 80 per cent of Russian power consumption is in the European part of the country. To some extent a transfer of power can be attempted by deflecting the northern rivers into the Volga Basin, but the increasing power needs of European Russia will in general have to be met by coal-fired stations. There is no apparent surplus of cheap power in European Russia which could be exported as aluminium and it may well be that Russia's entry into world aluminium markets is motivated by politics. The means of meeting Russian economic onslaughts may not be the least of the problems facing the Western world's metal industries.

Machinery and Equipment

Electric Heating of Vibrating Screens

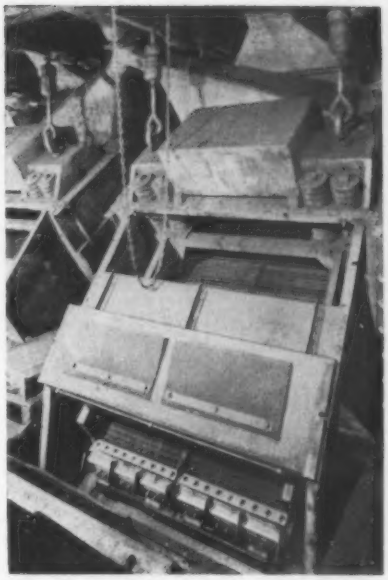
The provision of screen-heating equipment has proved its effectiveness in a quarry installation in the United Kingdom. Four standard 4 ft. by 10 ft. double-deck mechanically vibrated Gyrex screens were supplied by the Erith engineering works of the General Electric Co. Ltd. for sizing crushed rock, which was ¾ in. in size with about 30 per cent below ⅛ in. They were fitted with 7/32 in. and 3/32 in. square-mesh high-tensile steel-wire screen cloths. In rainy weather, although the overall moisture of the rock might not be more than 5 per cent, the fines would contain 10 to 12 per cent of water. This damp material would completely blind the lower 3/32 in. screen in about half an hour. Screening had then to be stopped and the meshes cleaned by hand with wire brushes before operations could be resumed.

To overcome these difficulties it was decided to fit heating equipment to the lower screen cloths. The conversion was carried out in collaboration with the Woden Transformer Co. Ltd., and has been very successful. The 3/32 in. oversize is now virtually free from undersize, however wet the fines may be. The screen temperature is regulated at 40 deg. C. for most of the year, but it can be dropped as low as 30 deg. C. in very hot weather. The throughput is about 25 tons per hour. The cost works out at 0.75d. per ton of screen feed with power at 1d. per unit.

At another installation (a coal-preparation plant at Blaengarw in South Wales, which was supplied and erected by the G.E.C. engineering works for the National Coal Board) four 4 ft. by 10 ft. Sherwen electromagnetic vibrating screens had been installed for sizing minus ¾ in. coal on ⅛ in. It was found that the coal coming up from the pit carried from 4 to 7 per cent moisture with 8 to 12 per cent in the fines, making effective screening virtually impossible. The installation of heating equipment again overcame the difficulty.

The illustrations show the way in which the electric heating equipment is fitted. The screen cloth is divided longitudinally into two separate sections, which are insulated from the frame and from each other by long strips of non-conducting material. The ends are clamped between bars of tinned steel, to which terminals are attached. Low-voltage current is supplied by a Woden "Clear-Mesh" heating transformer. It is taken from one of the busbars on the low-tension side of the transformer to terminals on the top of one of the longitudinal sections by means of rubber-covered cables.

The current passes through the wires of the screen to its lower edge, from which it is led by cables or copper strips to the bottom of the other section. Thence it passes up the wires to the upper edge, from which cables connect it with the other busbar of the transformer.

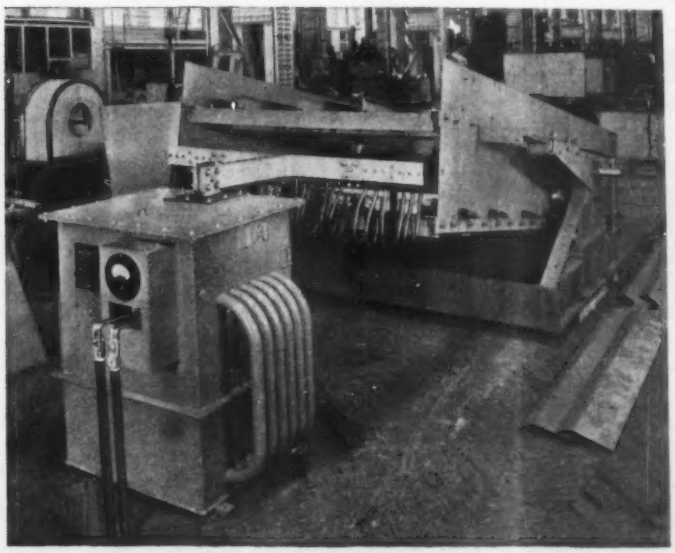


Above : Sherwen electromagnetic vibrating screen with single heated deck, showing bottom cross-connections

Below : Gyrex double-deck screen with heating on lower deck, showing transformer and tap connections

Sherwen screens are tensioned longitudinally and the screening surface consists of a single length of screen cloth. The electrical connections have therefore only to be made at the upper and lower edges of each longitudinal section. Gyrex screens are tensioned laterally and the screen cloths, except in the smallest size, are made up of a number of standard panels in order to facilitate screen replacements and reduce the number of spare cloths to be carried. Each separate panel has therefore to be divided longitudinally and fitted at the upper and lower edges with tinned-steel clamp bars. Terminals are fixed on the underside, and adjacent half-panels are connected up by short loops of insulated cable under the screen cloth.

The feed is normally directed on to the screen several inches below the upper edge, and thus it does not come into contact with the terminals and cables there. No precautions are taken, however, to protect the intermediate cables or the connections at the lower edge. The latter have to be renewed at comparatively long intervals, but the intermediate cables are unaffected. In general, the temperature that has to be maintained on the screening surface ranges from about 30 deg. to 40 deg. C.



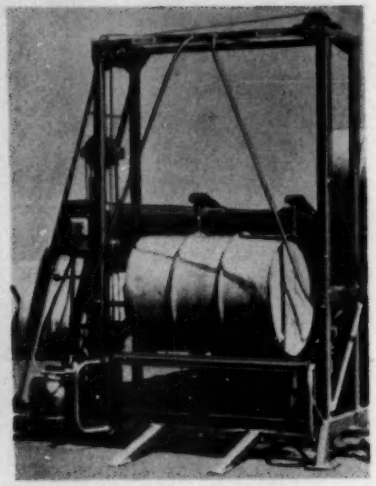
SELF-ACTIVATING LIFTER

A machine added to the Brimpex range of Industrial Machine and Equipment Co. Ltd. is a fully automatic barrel lifter, which enables one man, unaided, to load 40-45 gallon drums (7 cwt. max.) at up to 250 units per hour.

The operator rolls the barrels up the ramps into the machine. The barrels rest against telescopic guides which adjust themselves automatically to the height of the transport, and are carried up on a roller rotating on sealed ballbearings. Upon discharge, the downward slope of the off-loading ramps gives sufficient impetus to send them to the front of the lorry platform.

As soon as one barrel is discharged, the cradle returns automatically to the ground ready for the next load. When one row has been delivered, the operator normally uprights them on the platform before continuing with the next row.

The lifter may be powered by an electric motor (1½ h.p.) or petrol engine. It is easily transportable by one man, with



two rubber-tyred wheels at one end and a steerable dolly at the other. Brimpex barrel lifters are also available for permanent fixed use, and are a useful installation where, for instance, a factory has changes in floor level. They can be envisaged as having useful applications in surface installations.

NYLON-WEFT CONVEYOR BELTS

Two leading conveyor belt manufacturers have announced recently that they have obtained full N.C.B. approval for new types of plied belting incorporating nylon. The new belts have greater resistance to mechanical damage, and will, therefore, last longer and reduce long-term costs.

The majority of belting manufacturers consider that the use of nylon offers the most attractive means of achieving greater weft strength. The yarn has a tenacity of 8.8 grams per denier and is substantially stronger than any other textile yarn which can be used for the purpose. This yarn, 840 denier type 600, was, in fact, developed by British Nylon Spinners Ltd. in 1956 specially for belting and tyre cords.

Besides its strength, it has a number of other properties which make it particularly attractive for belting. It has greater shock strength than any other fibre and greater abrasion resistance. It has very high flex strength and wet strength. It cannot rot.

The North British Rubber Co. Ltd. have two nylon-weft belts which have been given full approval by the National Coal Board. Both have been designed as improvements on five-ply belting made from conventional 32-oz. cotton duck and both are considerably stronger. One has the normal number of plies, but the fabric is rather thinner and lighter in weight; the other has only four plies, but the fabric is of the normal thickness. In both instances the warp is all cotton and the weft is all nylon. Special constructions are employed to give improved joint-holding properties and to take full advantage of the better impact resistance gained by the use of nylon. At the same time, there is enhanced resistance to longitudinal tearing, fold-over damage, and ripping.

David Moseley and Sons Ltd. have also produced a five-ply belt with an all-cotton warp and all-nylon weft, designed as an improvement on the five-ply, all-cotton belt made from conventional 32-oz. cotton duck, and this is now undergoing observed field trials with the N.C.B. The weight of the cotton-and-nylon fabric is only about 22½ oz. per sq. yd., so there is a substantial saving in weight. The cotton-and-nylon belt is also considerably stronger, the strength for the warp being quoted at 1,870 lb. and that for the weft at 1,250 lb.

Dunlop Rubber Co. Ltd. have obtained full Coal Board approval for a nylon-weft belt specially designed to provide great strength with flexibility. The warp is composed of a mixture of cotton and rayon and the weft of nylon. This fabric produces a three-ply belt which is equivalent to a five-ply belt made from conventional 32-oz. cotton duck. Two important features which are emphasized are exceptional impact resistance to prevent damage from high-density materials together with higher longitudinal tear resistance to help maintain belt width and target capacity and to cut out spillage. The new belt, Starwear, is essentially a general-purpose belt for use where shock loads are likely to be severe. A four-ply belt has a seven-ply rating and a five-ply belt has a nine-ply rating. Starwear is available in standard widths with covers of either P.V.C. or rubber.

Above : The Brimpex barrel lifter

Below : A.E.I. lamp and lighting equipment in the car hall at Bo'ness Colliery. An overall illumination level of 10 lumens per sq. ft. is achieved over an area of 10,560 sq. ft.

B.T.R. Industries Ltd. have what is possibly the most revolutionary of all the new belts. This is a belt built from special ribbed fabric with a cotton rib, nylon stress bearer warp and nylon weft. Although it is only a two-ply belt, it is tougher than a five-ply belt based on 32-oz. cotton duck. Its construction is described as "unique", and it is said to be more fully covered by patents than any other belt in the history of the company.

Strength figures for both warp and weft are in excess of the standard for five-ply belting built from 32-oz. cotton duck. The impact resistance of the belting is substantially greater and its tear strength is so great that it proved impossible to tear it by the normal test method. In addition to the revolutionary two-ply belt B.T.R. Industries are also developing other types of conveyor belting incorporating nylon.

LIGHTING IN MINES

Dustproof fittings F1135 and F1136, manufactured by the A.E.I. Lamp and Lighting Co. Ltd., are the subject of a recent descriptive pamphlet issued by the company.

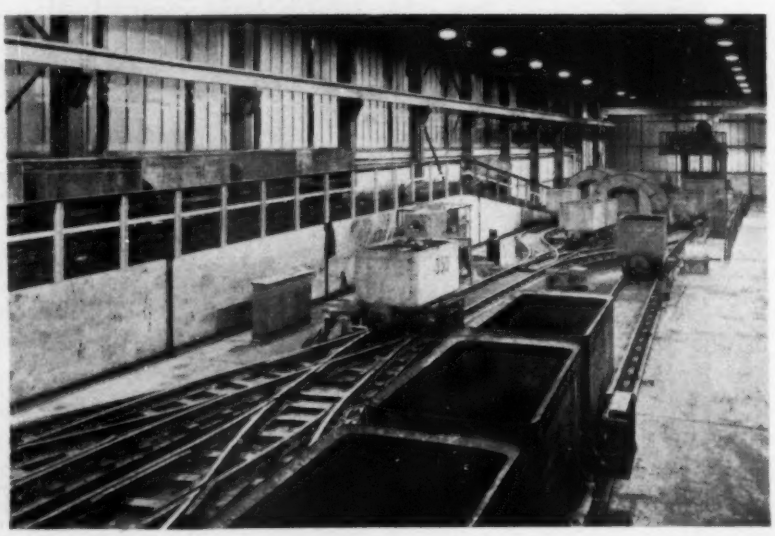
The dustproof fitting, developed initially for underground mine roadways, is suitable for any dust-laden atmosphere. There are two types: with "through" armoured cable boxes at each end, or with a "T" entry armoured cable box at one end. A white stoved-enamel steel reflector is available as an optional extra, for one 80-watt switch start lamp only.

The heavy gauge sheet-steel gear channel, electro-tinned and finished in grey stoved enamel, houses switch-start control gear for one 80-watt lamp. A gasketed lid in the top of the channel gives access to the gear. F1135 has "through" armoured cable boxes at each end for connection to the supply. F1136 has one "T" armoured cable box.

Aluminium castings mounted to the underside of the gear channel contain the lampholders and support the perspex cylinder which protects the lamp. The junctions between cylinder and castings are sealed by neoprene sleeves. Lamp replacement is simple and is effected from one end by loosening two screws which secure the end cap. The cap can then be removed, exposing a free B.C. lampholder and a push-and-twist action releases the tube from the fixed holder at the other end.

The gear channel is fitted with adjustable fixing brackets.

The equipment provides direct distribution, and overall efficiencies of 65 per cent and 79 per cent respectively with and without reflector.



MINING MISCELLANY

Tests in the Queensland and New South Wales coalfields will be made by a Japanese steel industry delegation interested in Australian coking coal and its suitability for the needs of the Japanese steel industry.

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The Chinese Vice-Minister of Geology has claimed that China ranks first of all countries in the world in its reserves of tungsten, molybdenum, and tin, and that its reserves of iron, manganese, copper, lead, aluminium, coal, and phosphate are among the richest in the world.

★

Coal deposits estimated at 67,000,000,000 tons have been found in Western Shantung, China, near the Tientsin-Pukow railway. Anthracite coal deposits have been found in several places near Lhasa. Iron ore deposits estimated at 7,000,000,000 tons have been located in central Kiangsi, and lumps of mica, the biggest weighing 20 kg., have been found in Yunnan.

★

The famous blue sapphire from the Ratnapura district in central Ceylon is in danger of disappearance, due to the recently passed Paddy Lands Bill, forbidding the use of fields for any purpose other than cultivation. The best gems are usually found in these fields. Gemming by the side of the main road in Ratnapura, which was a tourist attraction, will now cease.

★

An additional £200,000 of the £140,000,000 assets of the Otavi Mines and Railway Co. in South Africa has been released by the Custodian of Enemy Property in Pretoria, bringing the total released up to £500,000.

★

Iron ore deliveries from Canadian mines declined by 40 per cent in the first six months of 1958, due to lack of demand in the United States. Deliveries fell to 4,022,587 tons from the 6,713,149 tons in the corresponding period a year ago.

★

The losses of the Bolivian Mining Corp., in control of fourteen large nationalized mines, amounted to 1,565,542,162 Bolivianos during 1957. Results were influenced by losses in the mines producing minerals, whose prices fell considerably in price on the world market: lead, zinc, and copper.

★

An experimental furnace suitable for smelting New Zealand ironsands has been constructed by the chemistry department of Victoria University, Wellington.

★

The Bureau of Mines lead and zinc research programme in the United States will concentrate on metallurgical studies to develop improved methods for processing complex low-grade lead and zinc materials during 1959.

★

A mining engineering college may be created at Dakar, French West Africa, to overcome the lack of African technicians, and a training scheme launched for mining students.

Société Péchiney's exploitation of aluminium phosphate at Thies, French West Africa, is estimated to have reserves of 40,000,000 tons, with an exploitable potential of a further 30,000,000 tons.

★

A plant is being designed to handle 1,500,000 to 2,000,000 tons of iron ore per year in the Kolari region of northwest Finland.

★

Mineral products exported from Senegal, French West Africa, were valued at 430,000,000 frs. CFA. during 1957. Phosphates were valued at 230,000,000, and ilmenite, rutile, and zircon at 200,000,000.

★

The government of South Vietnam is undertaking the re-equipment of the coal mines at Nong-Son, Central Vietnam, and production is expected to increase to 100,000 tons a year.

★

It is hoped that extraction of Fort Gouraud, French West Africa, iron ore deposits will begin in 1962. The rail link with Port Etienne should be ready for use in 1959, and the intention is to maintain it by trains of 120 wagons, drawn by four locomotives, transporting 10,000 tons of ore. It is estimated that Fort Gouraud should export by Port Etienne an annual total of 6,000,000 tons of iron.

★

Recent exports of Greek mineral ores have dropped considerably, particularly pyrites and magnesite, and unemployment has resulted.

★

The Iron and Steel Community has allocated $5,000,000 for the prospection of iron ore and manganese deposits, to be divided between Guinea, French West Africa, and Gabon, French Equatorial Africa.

★

Copper has been discovered in Quebec in the Mattagami Lake-Bell River region by Kennecott Copper Corp.'s Canadian exploration subsidiary. Drilling started two weeks ago on property held by Kennco Explorations, Canada, with a single drill in operation.

★

Assisted by Mr. L. H. Abernatty, American mining expert, Ceylon's government mineralogist Dr. J. L. D. Fernando has conducted boring experiments in the Ratnapura area of Ceylon. As a result of the experiments, it is now believed that Ceylon can be self-sufficient in iron in a few years.

★

During the first six months of this year, the output of aluminium in Poland rose by 22.3 per cent to 11,000 tons, as compared with 9,100 tons in the first six months of 1957.

★

A deposit of copper ore estimated to contain 10,000,000 tons of metal has been discovered in the Breslau area, Poland. The vein is said to cover an area of about 200 sq. km.

★

An agreement was signed in Moscow this month between the Soviet and Chinese governments on aid to China. The agreement provides for technical aid to China in the building and extension of forty-seven metallurgical, chemical, coal, and other enterprises, and electric power stations.

★

Twelve thousand miners at four pits in Duisburg, Germany, will miss one day's shift this month, because of mounting pithead stocks of unsold coal.

★

President Eisenhower has vetoed a Bill to continue, until December 31, 1959, United States Government purchases of domestically produced asbestos and acid-grade fluorspar.

★

Fairchild Aerial Surveys Inc. has announced its exclusive licensing for the use of the American Metal Climax Inc. helicopter electromagnetic surveying system. Through the helicopter E.M. unit, known as H.E.M., Fairchild now offers a new aerial geophysical service with direct application to mineral exploration. Fairchild Aerial Surveys Inc. is a wholly owned subsidiary of Fairchild Camera and Instrument Corp.

★

There are few signs of a recession in the European metal-working industry, according to Dr. George A. Roberts, vice-president, Vanadian-Alloys Steel Co. Dr. Roberts toured European metal-working facilities while attending a powder metallurgy meeting at Reutte, Austria.

★

Ilmenite production in French West Africa will reach an estimated total of 65,000 tons during 1958 to 1959. The combined figure for ilmenite, rutile, and zircon could be increased to 100,000 tons a year.

★

Due to operation of a new third kiln, Palawan Quicksilver Mines, in the Philippines, produced during July a total of 24,575 lb. of metallic mercury, recovered from 6,836 tons of cinnabar ore. The July figures were much higher than those of the previous month.

★

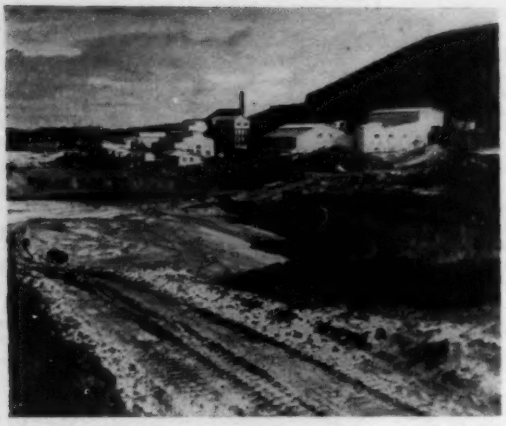
Increased re-deployment of surplus labour in the tin mines by intensification of gold, silver, lead and bismuth extraction in other areas, is among the Bolivian Government's plans for solving the difficult position created by the present state of the international tin market.

★

The American Ford, Bacon and Davis team whose contract as advisers to the Bolivian Government on mining matters expired on March 31, have been given a further contract for one year. In addition to their technical advisory activities, they will operate in conjunction with the U.S. Point 4 Mission in administering the credits to be granted to the Bolivian mining industry under the American aid programme.

★

Unexpectedly, large quantities of potash were found in samples obtained from oil borings in Jutland. A committee has been set up to study the possibility of mining it.



The works of King Island Scheelite Ltd.

Because of a drop in world prices for scheelite, the scheelite mine on King Island in Bass Strait, Australia, has closed down.

★

Exploitation of lead-zinc ore deposits at a rate of 220 tons of ore per day has begun at Pristina, Yugoslavia.

★

Iron ore exports to West Germany and Italy from Angola, Central Africa, now running at the rate of 100,000 tons a year, are likely to increase to 500,000 tons a year by 1960.

PERSONAL

Mr. W. M. Frames, formerly chairman of Rand Mines Ltd., has been named chairman of the International Nickel Co. S.A. (Pty.) Ltd., South African subsidiary of the International Nickel Co. of Canada Ltd.

★

Mr. B. A. Miller, A.R.S.M., M.I.M.M., A.M.I.Mech.E., has joined the board of Specialised Employee Selection Ltd., consultants who specialize in finding and selecting technical and other staff.

★

Mr. E. G. Kimsey, P.Eng., M.E.I.C., A.M.I.C.E., A.M.I.Mech.E., engineering contracts manager for Chamberlain Industries Ltd., will be visiting the United States and Canada during September and October to discuss the application of the "Staffa" slow-speed high-torque hydraulic motor which Chamberlain Industries is now manufacturing.

★

We are advised by North Kalgurli (1912) Ltd. that, last month, Mr. A. A. McLeod passed away suddenly.

★

Mr. S. Weinberg has been appointed chief engineer (specialist services) for the National Coal Board.

★

Mr. C. W. Englehard, the United States financier, has returned to South Africa to complete arrangements for the establishment of the American South African Investment Co. Ltd.

CONFERENCES AND EXHIBITIONS

Preparations are at present in progress for the International Scientific and Technical Conference on Mine Construction, which is to take place in Warsaw from September 16 to 25. The preparatory committee, under the chairmanship of Professor Boleslaw Krupinski, chairman of the State Mining Council, has representatives from six countries, including Great Britain, whose representative is Professor J. T. Whetton, D.S.O., O.B.E., of Leeds University. The congress will deal primarily with coal mining and will act as an international forum for exchange of experience relating to recent developments in mining engineering. About 200 delegates are expected from countries abroad, and some fifty-five papers are to be read. To coincide with the congress, the Gliwice Polytechnic is arranging an international exhibition on mine construction from September 10 to 25.

★

At the Atoms for Peace Exhibition, to be held at Geneva from September 1-14, 1958, more than 3,700 sq.m.—the largest area taken by any one country—has been reserved for British exhibitors. The British engineering industry can offer anything from complete nuclear power or research assemblies down to plans and advice based on the results of its own research. The United Kingdom Atomic Energy Authority offers a world-wide fuel supply and processing service to purchasers of British reactors. The A.E.A. is also ready to assist and advise other countries in setting up their own fuel production plants. On the metallurgical side, the British exhibits will include heat-resisting and corrosion-resisting alloys and some of the rarer metals used in nuclear engineering.

COMPANY EVENTS

G.W.B. Furnaces Ltd. announce that they have appointed Sheppard and Sons Ltd., Bridgend, Glamorgan (telephone: Bridgend 567) to represent them in the South Wales area for the sale of the G.W.B. range of Low Tension Control Gear from 10-1,400 amps a.c. and d.c., and for complete centralized control systems and panels.

★

As part of their annual outing, some forty members of the North Staffordshire branch of the Association of Mining and Mechanical Engineers, with their president Mr. T. I. Paterson, and accompanied by their ladies, visited the Rugby works of the British Thomson-Houston Co. on August 14, as guests of the A.E.I. Heavy Plant Division.

CONTRACTS AND TENDERS

India

Construction, Mining, and Conveying Equipment. Contract period, 30/6/58-28/2/59. Terminal delivery date, 30/6/59. Amount, $833,000. Ref. E.S.B. 19310/58 I.C.A. Telephone inquiries to Chancery 4411, extension 354.

★

Laos

Construction, Mining, and Conveying Equipment. Contract period, 30/6/58-28/2/59. Terminal delivery date, 30/6/59. Amount, $158,000. Ref. E.S.B. 19310/58 I.C.A. Telephone inquiries to Chancery 4411, extension 354.

★

Morocco

Construction, Mining, and Conveying Equipment. Contract period, 25/6/58-28/2/59. Terminal delivery date, 30/6/59. Amount, $1,020,000. Ref. E.S.B. 19310/58 I.C.A. Telephone inquiries to Chancery 4411, extension 354.

★

Vietnam

Construction, Mining, and Conveying Equipment. Contract period, 30/6/58-28/2/59. Terminal delivery date, 30/6/59. Amount, $600,000. Ref. E.S.B. 19310/58 I.C.A. Telephone inquiries to Chancery 4411, extension 354.

★

Spain

Construction, Mining, and Conveying Equipment. Contract period, 30/6/58-28/2/59. Terminal delivery date, 30/6/59. Amount, $90,000. Ref. E.S.B. 20052/58 I.C.A. Telephone inquiries to Chancery 4411, extension 354.

★

Canada

The United Kingdom Trade Commissioner in Toronto has been approached by Francis Caird (Canada) Ltd., who wish to contact manufacturing companies in the United Kingdom with a view to handling their sales in Canada. They are interested in specialized products for sale to the mine, oil, chemical, gas, heating, and piping contractors, and other industries. Firms interested in this offer should write, air mail, to Mr. William Taylor, Managing Director, Francis Caird (Canada) Ltd., 1141 Roselawn Avenue Toronto 10, Ontario. Ref. E.S.B. 19980/58. Telephone inquiries to Chancery 4411, extension 776 or 866.

★

India

Sealed tenders are invited for supply of 400 Nos. Mine Car Wheels and 400 Nos. Roller Bearings to Kurasia Colliery. Tenders will be received by Mr. K. Mitra, Purchase Officer, 1 Council House Street, Calcutta 1, up to 11 a.m. on 10/9/58, and opened the same day at 11.30 a.m. before the attending tenderers. Ref. E.S.B. 19888/58. Telephone inquiries to Chancery 4411, extension 738 or 771.

★

India

Sealed tenders are invited for the supply of 4 Nos. Diesel operated type mounted Air Compressors, 6,000 ft. compressed Air Pipes 2 in. dia., 6,000 ft. Compressed Air Pipes 1 in. dia., and 10 Nos. Compressed Air Hammer Drills complete to Kurasia Colliery. Tenders will be received by Mr. K. Mitra, Purchase Officer, 1 Council House Street, Calcutta 1, up to 11 a.m. on 15/9/58, and opened the same day at 11.30 a.m. before the attending tenderers. Ref. E.S.B. 20198/58. Telephone inquiries to Chancery 4411, extension 738 or 771.

Metals and Minerals

A Fifty-fifty Chance

A few days ago the odds on House approval of the United States Government's $458,000,000 minerals subsidy programme were said to be about 50-50. However, the latest reports are rather more encouraging.

The measure cleared one of the last remaining hurdles last week when the House of Representatives Rules Committee, which had been regarded as a major obstacle, approved it for floor action. Having successfully survived a move in the House to kill it, the Bill was expected to come up for final vote on Thursday, and possibly its fate may be known before this issue emerges from the press.

Briefly, the Minerals Subsidy Bill, which was approved by the House Interior Committee towards the end of July, would provide the same subsidy payments to producers as the Senate-approved measure on lead, zinc, tungsten, and acid-grade fluorspar sales. It would also authorize the Secretary of the Interior to purchase 150,000 tons of copper for the national stockpile.

Passage of the Bill is not expected to have any immediate effect on lead and zinc prices, inasmuch as it does nothing to solve the producers' most pressing problem, which is the continued growth of stocks. On the other hand, postponement or cancellation of the new stockpiling programme might well lead to renewed weakness in United States copper prices, which could temporarily outweigh other considerations.

A point of considerable importance is that, whereas the Senate measure would allow the Secretary of the Interior to borrow directly from the Treasury the funds needed for the five-year subsidy programme, the House Bill would require a Congressional appropriation each year. It follows that unless the Senate payment provisions were adopted, Congress would still have to pass a separate appropriation measure, which might be no easy matter in the short time available before the adjournment.

At this critical period, when the eyes of the Free World copper industry and trade—as well as those of investors and speculators in copper shares—are riveted on Washington, there has been an encouraging expression of faith in the future of the red metal by one of the largest consumers. Mr. Herod, president of the General Electric Co., states that although there will be temporary fluctuations in demand for copper due to price variations, consumption of the metal by the electrical industry would probably double over the next decade.

MORE ALUMINIUM IN AMERICAN CARS

An official of Kaiser forecasts that accelerating use of aluminium in American cars, coupled with a resurgence of car buying, will increase the motor car industry's consumption of the light metal by nearly 50 per cent over 1958, and further gains are in prospect. On the basis of a predicted production volume of 5,900,000 cars, the motor car industry would require 168,500 s.tons of aluminium against an estimated 114,000 s.tons consumed in 1958.

A survey made by Kaiser indicates that the average amount of aluminium in 1959 car models will increase by 14 p.c. over 1958 models. The average usage per car will thus be 57.1 lb. compared with 50 lb. in 1958 and 46.3 lb. in 1957.

The outlook is considered to be even brighter when calculations are projected into the early 1960s, when the use of such major new aluminium components as engine blocks, wheels, bumpers, and radiators is expected to be realized. The company notes that cast applications, engine blocks and wheels in particular, represent "tremendous potential volume". It forecasts that by 1962 an additional 100,000 s.tons of aluminium would be required for castings. This would represent a total of some 72 lb. of castings per average car, or more than double the 1958 usage for this purpose.

*

Trade sources in London are quoted as stating that the downward pressure on open market aluminium prices appears to have abated. Prices have even steadied and Russian and Hungarian metal of minimum 99.5 per cent purity is currently on offer at about £170 per ton c.i.f. A few weeks ago the open market price was in the region of £160.

Though some business is reported to be passing, buying interest in the United Kingdom remains at a low ebb, possibly because of the continuing silence of the British Government regarding its intentions about the anti-dumping duty on Russian metal. In the first five months of the current year, United Kingdom imports of Soviet aluminium totalled 7,479 tons against 15,450 tons in all 1957.

Canada's contract price to United Kingdom consumers remains £180 delivered. Taking into account the "loyalty discount" of about £3 12s., and putting Russian metal on a delivered basis, the price differential of some £11-£12 recently prevailing has narrowed considerably.

*

Harvey Aluminium Co. has started regular production of primary aluminium at its new reduction plant at Dallas, Oregon, on the Columbia River, U.S.A. Delivery of the first commercial output will be made in sixty to ninety days. The smelter has a capacity of 50,000 tons p.a.

*

Péchiney has contracted to provide technical assistance to modernize and expand Yugoslav alumina and aluminium plants at Kidricevo and Lozovac. The agreements aim at the expansion of alumina production at Kidricevo from 45,000 to 90,000 tonnes a year and then to 140,000 tonnes. Péchiney states that expansion will be secured for a relatively small capital investment. Most of the equipment will be built in Yugoslavia.

*

Aluminium Union Ltd., of Canada, is planning to install a £100,000 aluminium fabricating industry in Ghana.

WOLFRAM'S IMPROVING PROSPECTS

Although there are still few signs of any quickening in the demand for wolfram ores, it is expected that business will improve. To what extent a better demand will affect prices remains conjectural, however, since there are still quite extensive stocks to be liquidated. Once these have been reduced to more manageable proportions, prospects of prices appreciating will be enhanced, because of the reluctance of sellers to operate at the prevailing uneconomic levels. Production costs are said to be, in general, considerably above the prevailing level in London of 62s. 6d. to 67s. 6d. per l.ton unit c.i.f. Europe.

PLATINUM'S CONTINUED WEAKNESS

Further weakness has been evident in the platinum market, both in London and New York, due to continued slack consumption and demand plus heavy Russian offerings in world markets. After remaining for about a month in the region of £20 to £21 per troy oz., platinum was being sold on the open market at the end of last week at about £19 10s., being thus nearly £4 an oz. cheaper than the price of £23 5s. still quoted by the two leading refiners of platinum in the United Kingdom. The supplies to the open market are almost entirely of Russian origin.

Whether the official price is again lowered to compete with outside supplies will doubtless depend on the platinum industry's assessment of the market outlook once the peak holiday season is past. Possibly the industry might decide to maintain its current prices, on the ground that the substantial output cuts in both South Africa and Canada should have been sufficient to bring supply and demand into balance again, more especially as the principal consumers—apart from the oil industry—are reported to have been maintaining their orders better than at one time had been expected.

TUNGSTEN IN 1957

Production of tungsten concentrate in the United States declined 46 per cent and mine shipments declined 63 per cent in 1957, compared with 1956, according to the Bureau of Mines, U.S. Department of the Interior. Production amounted to 4,016 tons. When it became evident that Government purchases would not be resumed, mining operations were curtailed or stopped. Although 84 producers reported output in 1957, only four mines operated continuously throughout the year. Although consumption at 4,272 s.tons (4,530) was relatively stable, stocks held by industry nearly doubled during 1957, amounting at the end of the year to 2,031 s.tons. General imports fell to 7,093 s.tons from 10,929 tons in the previous year.

World production is estimated to have

fallen last year to 72,200 s.tons from 82,500 tons in 1956. Of last year's total an estimated 22,000 s.tons came from China and 8,300 s.tons from the U.S.S.R. The largest Free World producer was Bolivia with 4,809 tons (exports), followed by the Korean Republic (4,580 tons).

MORE TANTALUM PLANTS

The Stauffer Chemical Co. is constructing a semi-production plant to produce tantalum and columbium pentachlorides at its research laboratories in Richmond, California. The new unit, which will cost more than $300,000, is expected to supply considerable quantities of material for the expanding tantalum and columbium metals industry. It will provide technical data for the design of a full-scale plant.

Another important development in the United States is the achievement of commercial production of very high purity tantalum metal. This follows a two-year research programme by the National Research Corp., which led to a new process for large-scale reduction of tantalite ore to tantalum metal powder of a purity hitherto unavailable commercially.

Production at the company's Cambridge plant is now up to 15 s.tons per year, and plans are being made for a very large increase in the capacity of the plant. Consumption of "electronics grade" tantalum in the United States is roughly doubling each year. High purity tantalum metal is also regarded as having great significance to chemical processing, atomic energy, and other industries.

The unusual corrosion resistance properties of tantalum have led to several important applications in the chemical process equipment industry. In conditions where particularly severe corrosion conditions were encountered, tantalum in some instances was the only metal found which would resist chemical attack. Ability to maintain a clean and efficient heat transfer surface under corrosive conditions has also proved to be a major advantage.

The company purchases tantalite ore through established sources in the major mining areas in Central Africa, Western Australia, and Brazil.

RECOVERY FOR U.S. MAGNESIUM?

The United States magnesium industry expects a recovery in activity during the next six months, because of a prospective increase in military orders. In the first half of 1958, output was trimmed to a little less than one-half of installed capacity, amounting to approximately 19,000 s.tons against 41,000 in the corresponding period of 1957. Despite this curtailment, producer-consumer inventories of magnesium ingot and alloys in the United States are not believed to be much smaller than the 70,000 tons held at the start of the year.

Because of its light weight and heat-resistant qualities, magnesium is being widely used in the United States in the propellant sections of missiles. The Magnesium Association points to the use of magnesium for the German Volkswagen engine block as possibly auguring widespread commercial application of this metal by car manufacturers and other metal-consuming industries in the United States.

U.S. BERYL SUPPLIES

According to Mr. William Dansby, president of the Beryllium Mining Association, the United States is now assured of a stable and substantial domestic supply of beryllium ore. Mr. Dansby stated that the Crystal Mountain and Storm Mountain areas in Colorado had a "substantial supply of beryllium" for the next thirty years. It was added that the 350 to 400 tons of beryllium ore now offered daily from this source was equal to the total known world production only two years ago. At present, beryl is high on the list of strategic materials being stockpiled by the United States Government.

Last year the United States imported 7,290 s.tons of beryl from eleven countries, with Brazil, Argentina, India, and Mozambique supplying 81 per cent. How far the pattern of supply will be affected by the development of this new source must remain a matter for conjecture at this stage.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

Prices have shown little change over the last week but with the probability of the Seaton plan being passed the undertone for copper has strengthened whilst that for lead and zinc has weakened. The tin market has continued under pressure of sales probably on Russian account.

COPPER CONTANGO DISAPPEARS

General demand for copper throughout the world has remained satisfactory, especially considering the time of year. There has been little talk of any changes in the major prices quoted, although some people consider that the customs smelter price in America will ultimately have to be reduced so that it stands 0.50 c. per lb. below that of the producers.

On the London market the contango has again disappeared and stocks in official warehouses at the beginning of the week showed a further slight reduction of 115 tons to total 12,342 tons. In Rhodesia the labour troubles appear to be on their way to settlement as full negotiations between the parties concerned are to be resumed almost immediately.

As expected, when the list of articles which were removed from the embargo list was published, it was found that the major non-ferrous metals were in it. This however, has had little effect to date as the majority of traders believe that there will be no wild rush to buy copper, and in any case there are some people who think that should copper be bought, then other non-ferrous metals such as aluminium, tin, and zinc will have to be sold in larger quantities to pay for it and at the present time any such action would cause near disaster to the markets concerned.

Guesses as to the tonnage of copper delivered to domestic fabricators in the States in July were fairly accurate, the final tonnage being 77,523 s.tons. Against this, however, mine production declined by almost 7,000 tons to 64,416 s.tons and producers' stocks fell by 2,669 s.tons to 242,781 s.tons.

TIN AGAIN SUPPORTED

The tin market has once again had to be actively supported by the buffer stock manager and considerable tonnages of metal have had to be taken during the last few days. In addition to this, the pressure on forward metal has at times been sufficient to cause a backwardation to appear. Surprisingly, stocks in official warehouses showed a very appreciable fall at the beginning of the week by 487 tons, bringing the total down to 17,045 tons. Pan Malayan exports in July amounted to 3,533 tons as compared with 2,997 tons in June.

Nothing definite is likely to be known about Russia's reply to the invitation from the Tin Council until the latter's next meeting. Most people consider, however, that it is unlikely the Russians will join the scheme and they see little point in them becoming merely observers.

In America, consumer offtake remains very disappointing and in this country and in Europe holiday influences are still at work so that the buffer stock manager may remain the chief buyer on the market for some weeks to come. On Thursday morning the Eastern price was equivalent to £750½ per ton c.i.f. Europe.

LEAD PRICE REDUCED

Towards the end of last week the American lead price was unexpectedly lowered by 0.25 c. per lb. to 10.75 c. per lb., delivered New York, the reason given being that the London market was so low that it was essential to reduce the price in America to prevent a flood of imports. No appreciable buying developed at the reduced level, and with consumption throughout the world at a very low ebb at the moment, the whole price structure looks somewhat shaky. It would not be surprising to see a further £4 recession in the London price and an equivalent reduction in New York.

The zinc picture remains almost entirely unchanged, with demand being described as "spotty", but unlike lead, cutbacks in production now seem to be taking some effect and there is very little talk of any reduction in the price levels.

The closing prices are as follows:

	Aug. 14		Aug. 21	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£206½	£206¾	£207½	£207¾
Three months ..	£206¾	£207	£207½	£207¾
Settlement ..	£206¾		£207¾	
Week's turnover	7,450 tons		7,150 tons	
LEAD				
Current ½ month	£69½	£69½	£67½	£68
Three months ..	£71	£71¼	£69¼	£69½
Week's turnover	3,900 tons		5,675 tons	
TIN				
Cash	£730	£730½	£730	£730½
Three months ..	£730	£730½	£730	£730½
Settlement ..	£730½		£730½	
Week's turnover	1,285 tons		1,435 tons	
ZINC				
Current ½ month	£63½	£63¾	£62	£62¼
Three months ..	£64¼	£64¾	£62¾	£62¾
Week's turnover	7,050 tons		3,825 tons	

London Metal and Ore Prices appear on page 208.

Mining Finance

Uranium in Search of Markets

The first uranium contracts awarded by the C.D.A. to South African gold mines have now run half their course, and only five years remain before these producers are faced with the problem not only of delivering their uranium but of selling it. It is well known that the competitive position of those producers where uranium is a by-product of gold should be eminently satisfactory. Nevertheless, however low the price, unless demand exists the product is worthless. This is all the more true of a metal like uranium, with, in effect, only one market as far as utilization is concerned.

In these circumstances it is natural that the mines should look to the Atomic Energy Board for assistance. The Board has responded in two ways. The first of these was the obvious step of allowing the mines to find markets outside the C.D.A. if they were able, a step which in any case became essential when a ceiling of 6,200 tons annually was placed on the amount of uranium the C.D.A. were prepared to purchase under the contract scheme. As yet the industry has had little success in finding independent buyers, and this has led to the second step, announced last Friday by Dr. van Rhijn, minister of mines. A sales committee is to be set up, under the Atomic Energy Board, in an attempt to centralize the search for new outlets. Whether the committee will be able to achieve much success in the near-term seems doubtful, in view of the present state of oversupply. On the other hand, on a long-term view the organization could prove of the utmost value, because, as was pointed out in a leading article last week, the horizons of atomic energy are still widening dramatically.

From the investors' point of view it would still seem unwise to treat uranium as any more than a welcome bonus when valuing the majority of Kaffirs. For those who wish to take a speculative interest in the new developments, however, the mines to look for are those whose uranium grades are high, giving a low treatment cost per lb., and whose output can be stepped up without a great deal of difficulty. Such mines as Harmony and the three Lucas Block producers would seem to fill the bill.

A.-S.A.I.T. CLEARED BY S.E.C.

The American-South African Investment Trust, formed by the Dillon Read banking organization to acquire a $30,000,000 portfolio of South African shares, cleared its penultimate fence last week — the Securities and Exchange Commission, which controls applications for Stock Exchange quotations by means of extremely stringent and searching conditions and tests, approved the Trust's proposals. The way is now clear for the Trust to approach the last and most vital hurdle of all — the public issue.

It is evident that a great deal depends on the success of this flotation. South Africa, it seems, genuinely desires to attract foreign capital, in spite of occasional rumblings to the contrary from isolationist elements in the Nationalist Party. The recent budgetary concessions made this quite certain. It is also clear that investors in this country are unwilling, if not unable, to supply capital in the quantities needed. In this context, A.-S.A.I.T. must be seen as a pilot scheme, albeit a substantial one, and should the issue go well, others will follow.

In fact, there is no reason why the issue should not prove extraordinarily successful. Market prices of Kaffirs are currently based on a yield of about 8½ per cent for a mine in full swing, and in all probability the Trust, which is acquiring most of its stock direct from the Houses, has been able to buy on even better terms. On Wall Street, on the other hand, Homestake (the most important U.S. gold producer) is currently priced to yield about 4 per cent. By American standards, therefore, it should not be difficult for Dillon Read to offer extremely attractive terms.

BREMANG BORROWS £150,000

One of the major difficulties in the way of a revival in the fortunes of Bremang Gold Dredging, the Ghana producer, has been the awkward coincidence in time of three adverse factors —the end of the government grant last June, the liability to repay £200,000 of debentures by 1961, and two dredge removals necessitated by the exhaustion of reserves. It was therefore not surprising that no dividend was paid for 1957.

It was apparent, too, that the future of the company was largely dependent on the attitude of the Ghana Government. Fortunately, Dr. Nkrumah's administration pursues a most enlightened policy towards the mining industry. Evidence of this enlightenment has been given in the latest budget, which, it is believed, will afford some tax benefit to the U.K.-registered gold producers, and again in the invitation to a Canadian expert, Mr. Monture, who has been asked to examine the whole question of relief to Ghana's four low-grade producers.

Mr. Monture is now in West Africa, visiting the marginal mines, and it may not be too long before the Ghana authorities can announce the result of the investigations. The government has already made it known that it is thinking on the lines of a Canadian or Australian style subsidy based on cost levels. In the meantime, however, Bremang's finances must be under severe stress, and as an interim measure the government has once more illustrated its benevolence towards mining by offering the company a loan of £150,000, interest free until 1960. Repayment will fall due over the five years 1960-65, interest accruing at 2½ per cent during this period.

Announcing this at last week's annual meeting, Mr. C. J. Burns, who recently became chairman in place of Major General W. W. Richards, said that he had been personally assured that any subsidy to which the company was entitled would be deducted from repayments under the loan scheme. He added that the transfer of the No. 3 dredge was proceeding according to plan.

Extracts from the circulated statement are on page 208.

TAX TAKES 60 PER CENT OF GEEVOR PROFITS

The report and accounts of Geevor Tin, of Cornwall, give a sharp reminder of the difference in attitude between Ghana's progressive outlook on mining and that of this country, which, to say the least, is disheartening to the few companies exploiting Britain's native metal resources.

In the year to March 31 last, Geevor made a profit of £59,278 before tax, but after depreciation, a not unsatisfactory result in the face of a rising wage bill and falling tin prices. After taxation, the balance was £22,371—a reduction of over 62 per cent. Such a rate might be not unreasonable in a time of high prosperity, but when past inflation is still affecting labour costs and present disinflation metal revenue, it must be described as penal.

Geevor is proposing a final dividend of 1s. 3d. per share, making a total of 1s. 9d. for the year. Last year dividends totalling 2s. 6d. were paid from a profit of £102,670 before tax and £43,357 after tax. Mr. G. W. Simms is chairman.

COLUMBITE COLLAPSE CUTS NIGERIAN PROFITS

Through the collapse of the columbite market, Ribon Valley (Nigeria) Tinfields made a profit of only £5,786 in the year to March 30 last, against £10,136 in 1957. Tin output was unchanged, and costs were slightly lower.

Ribon Valley (Nigeria) Tinfields is among the worst hit of all producers under the tin restriction scheme, and the effective cut in output for the last three months of this year will be 67½ per cent. In his circulated review, Mr. A. Hedley Williams, the chairman, says that a new orebody has been discovered on the Odegi leases, in which Ribon Valley and United Tin Areas have a one-third and two-thirds interest respectively. The deposit is not alluvial, as are the companies' other areas, and some production has already been won by opencast methods. Nevertheless, a great deal of work remains to be done, and in any case production on a large scale will be impossible until output restrictions are lifted.

United Tin Areas made a loss of £11,895 in the year ended March 31 last. This compares with a loss of £4,070 in the preceding financial period, consisting of the nine months to March 31, 1957. The increased loss, says Mr. A. Hedley Williams, was largely due to rising costs caused by a decline in the grade of ground worked, and by the disappearance of demand for columbite, which necessitated the transfer of operations from columbite/tin areas to purely tin-bearing areas.

Financial News and Results

Mount Morgan.—Subject to completion of the audit, net profit of Mount Morgan for the year ended June 30, 1958, was £259,771 after providing £100,000 for depreciation. Last year's net profit, also after £100,000 for depreciation, was £395,048, but this figure includes substantial non-recurring amounts, including surpluses from the smelting of stocks of concentrates and from the reduction of metal stocks, and is thus not strictly comparable. A dividend of 1s. per 1s. stock unit has been declared—the first distribution since September, 1957, when a final payment of 6d. brought the total for 1956/57 to 1s. 6d.

Central Norseman's Profits.—The Australian gold producer, Central Norseman, earned marginally better profits in the year to March 31 last. After all charges except tax of £4,359, earnings were £664,177, against £655,078 before tax of £3,321 in the preceding year. (All figures in Australian currency.) Dividends of 1s. 6d. and bonuses of the same amount for 1957/58 are unchanged from the previous year. During the year, ore reserves increased from 447,000 tons at 8.5 dwt. to 584,000 tons at 9.2 dwt.

Mining Geophysics Buys Goldfields Uranium.—About 1,000,000 shares in Goldfields Uranium Mines have been bought by the Mining Geophysics Co. from Rio Tinto Mining of Canada at a price believed to be in the region of 54 c. per share. This gives Mining Geophysics control of Goldfields Uranium.

BREMANG GOLD

The twenty-first annual general meeting of Bremang Gold Dredging Co. Ltd. was held on August 14 in London.

Mr. C. J. Burns, Chairman, presided.

The following is an extract from the circulated statement.

The total throughput of the four dredges for the year ended December 31, 1957, was 8,268,300 cubic yards. Gold recovered was 43,300 ounces.

The dismantling and removal of the No. 4 dredge from the Ankobra River was commenced on February 20, 1957, and full-scale operations recommenced on the Jimi River on September 12, 1957. Great credit is due to all concerned for so successfully carrying through this major operation in only a few days outside schedule.

Some £149,000 was spent on Capital and Dredge Removal Account, practically the whole of it on the transfer of the dredges from Ankobra to Jimi/Offin. Some of this expenditure is on account of the transfer of the No. 3 dredge scheduled for removal in the early part of 1959. By the end of 1958, the No. 3 dredge will have completely dredged and exhausted the reserves allocated to it on the Ankobra River.

A profit of £70,860 was earned during the year. Your Board do not feel justified in recommending the payment of a dividend while arrangements for more stable finance are being negotiated.

Results for the first five months of the current financial year are 4,114,100 yards treated for recovery of 21,605 ounces of gold and an operating profit of £87,721

The Company is operating profitably and dividend payments will be resumed as soon as the cash position permits.

LONDON MARKET HIGHLIGHTS

News that the Dillon Read Trust had been given permission by the United States authorities to go ahead with its $30,000,000 share offer in New York quickly lifted the gold share market out of its lethargy.

The Cape started the revival in Golds with active bidding for shares considered likely to be sought after by the Americans. Hartebeest, Vaal Reefs, "Ofsits", Free State Geduld, and Stilfontein, were among those to show appreciable price gains.

As far as Hartebeest were concerned, there was an additional hope that the new sub-vertical shaft had reached the Vaal Reef horizon; Johannesburg reports later indicated that station-cutting may delay this for a week or two. Underground progress was also mentioned in connection with Welkom (15s. 7½d.), where there was talk that the south-western part of the mine was opening up well. Middle Wits advanced to their best this year of 16s. 9d. on their Zandpan interests. Another feature was the sudden emergence of Brussels as a buyer of Western Reefs (30s.) and Crowns (24s. 6d.).

Meanwhile, *The Financial Times* gold share index edged up and surpassed its August, 1957, peak of 78.3. This move was considered to be particularly important in that it finally convinced the chartists followers that the seven-year bear market ended in May, 1957.

Copper shares for the most part fluctuated narrowly with New York and the metal price. Again it was borne very much in mind that approval of the U.S. Minerals Subsidy Bill was a vital factor in the outlook for a firmer metal price. The rise in share prices over the past few months has discounted a great deal of further improvement in the copper price. With the U.S. Bill's chances of adoption hanging in the balance, there was no great keenness to extend commitments in copper shares.

The tin share market was temporarily dismayed when the price of forward tin fell below £730 a ton. Prices lost comparatively little ground, however, and soon brightened again when three months' tin rallied.

A steady recovery in lead-zinc shares left the market baffled. Both metal prices remained weak, that of lead falling to its lowest for eleven years. The U.S. Minerals Bill, while providing a stockpile for copper, merely sets out subsidy payments to United States producers in the case of lead and zinc. If approved, the Bill could only make the other world producers' position more difficult. Despite all this, Consolidated Zinc advanced 2s. to 50s. 3d., Broken Hill South 2s. to 45s., and New Broken Hill 1s. to 33s.

LONDON METAL AND ORE PRICES, AUG. 21, 1958

METAL PRICES

Aluminium, 99.5%, £180 per ton
Antimony—
English (99%) delivered 10 cwt. and over £190 per ton
Crude (70%) £190 per ton
Ore (60%) bases 19s. 6d./20s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 10s. 0d. lb.
Cerium (99% net), £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d. lb.
Cobalt, 16s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 8d. per gram
Gold, 250s. 0½d.

Iridium, £20/£22 oz. nom.
Lanthanum (98/99%) 15s. per gram.
Manganese Metal (96% - 98%) £290
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £17/£18 oz. nom.
Osmiridium, nom
Palladium, £5/£5 15s.
Platinum U.K. and Empire Refined £23 5s. oz.
Imported £19 0s./£21 0s.
Quicksilver, £79 0s. ex-warehouse
Rhodium, £40/£42 oz.
Ruthenium, £14/£16 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 75d. f. oz. spot and 74⅛d. f'd.
Tellurium, 15s./16s. lb.

ORES AND OXIDES

Bismuth	30% 5s. 0d. lb. c.i.f. 20% 3s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable) 48% (Ratio 3:1)	£15 15s. 0d. per ton c.i.f.
,, Hard Lumpy 45% (Ratio 3:1)	£15 10s. 0d. per ton c.i.f.
,, Refractory 40%	£11 0s. 0d. per ton c.i.f.
,, Smalls 44% (Ratio 3:1)	£14 0s. 0d per ton c.i.f.
Baluchistan 48% (Ratio 3:1)	£11 15s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade	nom.
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)	156s. 0d. ex works
Lithium Ore—	
Petalite min. 3½% Li_2O	40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O	40s. 0d./45s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O	£25 0s. per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£22 0s. d/d
Manganese Ore Indian—	
Europe (46% - 48%) basis 67s. 6d. freight	nom.
Manganese Ore (43% - 45%)	nom.
Manganese Ore (38% - 40%)	nom.
Molybdenite (85% basis)	8s. 5d. per lb. (f.o.b.
Titanium Ore—	
Rutile 95/97% TiO_2 (prompt delivery)	£35/£36 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO_2	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	62s. 6d./67s. 6d. per unit c.i.f.
Vanadium—	
Fused oxide 95% V_2O_5	8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand Australian) (65 - 66% ZrO_2)	£14 0s. per ton c.i.f.

Book Reviews

"The Lead-Zinc Ore Deposits of the Black Forest", *by R. Metz, M. Richter and H. Schurenberg. Supplement No. 29 of "The Geological Yearbook", published by the Association of German Metallurgical and Mining Engineers, Department of Mineral Deposits, at Clausthal-Zellerfeld, West Germany, in co-operation with the Provincial Geological Departments of the West German Republik. 1957. 277 pp., 113 illus., diagrams, 24 tables, geol. map 1:50,000 of the Southern Area of the Black Forest, biblios., price 40.- DM. (German text.)*

The volume presents a full account of the lead-zinc ore deposits of the Black Forest region, south-west Germany, and is probably the most comprehensive of any that have yet appeared on this subject. The lead-zinc deposits of the Black Forest were worked in the Roman times. Smelting of silver from galena caused a period of prosperous mining in the thirteenth century. In the eighteenth and nineteenth century lead and zinc were mined principally, while silver declined into a by-product.

In the last century a British-German mining company had a leasehold over seventy mines. Nowadays in the Black Forest there is no mining for lead and zinc. Several lead- and zinc-containing veins are exploited for fluorite only. The work is a valuable record of what has been done and contains comparative statistics and information on the general operation and production of all former mine workings with many sketches, graphs, and data tables.

The opening chapter describes the topography, mines, distribution of ore occurrence, and the geological conditions in the Black Forest region, together with explanations of the geological map contained in the appendix. Further chapters deal with particular lead-zinc veins. A chapter is devoted to the historical survey and the development of the mining industry of the Black Forest, and discusses the present-day economic position of the lead-zinc mines.

A notable feature is the excellent description of the relationship between geological structure and occurrence of ore veins. This useful contribution by geologists to the mining industry will undoubtedly be of assistance not only to those who are interested in the background of the ore deposits of this region and how they came into existence, but also to those engaged in mine exploration and development, for the necessary indications, to assist the revival of the lead-zinc industry in the Black Forest. The book is complete with an index of the lead-zinc ore veins in the Black Forest and references to the geological map.

Colliery Year Book and Coal Trades Directory, 1958. *36th edition. Published at 40s. net by Iliffe and Sons Ltd. (by post 42s.). Size 8¼ in. x 5½ in. 876 pp. Cloth bound.*

Detailed information on coal mining and allied industries is presented in the 36th edition of the Colliery Year Book. A feature of the directory in the past few years has been material on the coal mines in Western Europe and the United States of America, and also included are details of coal mining in Poland and the U.S.S.R.

Every coal mine in Great Britain is listed with full particulars, together with current information on the Ministry of Power, the National Coal Board, and the Mines and Quarries Regulations, 1956, with the 1957 amendments.

*

An invaluable aid to research, purchasing, and market analysis, the 51st annual edition of Metal Statistics contains statistical information on ferrous and non-ferrous metals and miscellaneous economic subjects. Among the new tables which have been added to the book are world production of chromite, world production of bauxite, shipments of aluminium foil in U.S., and imports from Canada and Connellsville, foundry and furnace coke prices.

RAND, KLERKSDORP AND O.F.S. GOLD AND URANIUM PRODUCERS

Comparison and analysis of results for the first six months of 1958 and 1957

Heading		*January to June*	*Rand Cos.*	*Klerksdorp Cos.*	*O.F.S. Cos.*	*Total*
Tons milled :	Millions	1958	24·1	3·1	5·0	32·2
		1957	25·5	2·9	4·8	33·2
Ounces produced :	Millions	1958	5·4	1·2	2·0	8·6
		1957	5·6	1·0	1·8	8·4
Grade per ton :	Dwt.	1958	4·2	7·8	8·2	5·2
		1957	4·2	7·0	7·4	4·9
Working costs per ton :	s. d.	1958	43/8	54/0	55/8	46/6
		1957	41/11	52/6	55/11	44/10
Working Profits	Gold : £m.	1958	11·8	6·8	10·6	29·2
		1957	13·9	4·7	9·0	27·6
Working Profits :	Uranium : £m.	1958	9·7	5·6	3·0	18·3
		1957	8·7	3·9	3·0	15·6
Total Profits :	£m.	1958	21·5	12·4	13·6	47·5
		1957	22·6	8·6	12·0	43·2
Dividends declared : (net total)	£m.	1958	9·1	5·0	6·1	20·2
		1957	9·1	3·0	4·0	16·1
Non-European employees at end of June		1958	236,000	39,000	60,000	335,000
		1957	244,000	35,000	57,000	336,000
No. of Companies included		1958	37	7	10	54
		1957	37	7	10	54

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Further details and application forms can be obtained from the Recruitment and Personnel Division, Malaya House, 57 Trafalgar Square, London, W.C.2.

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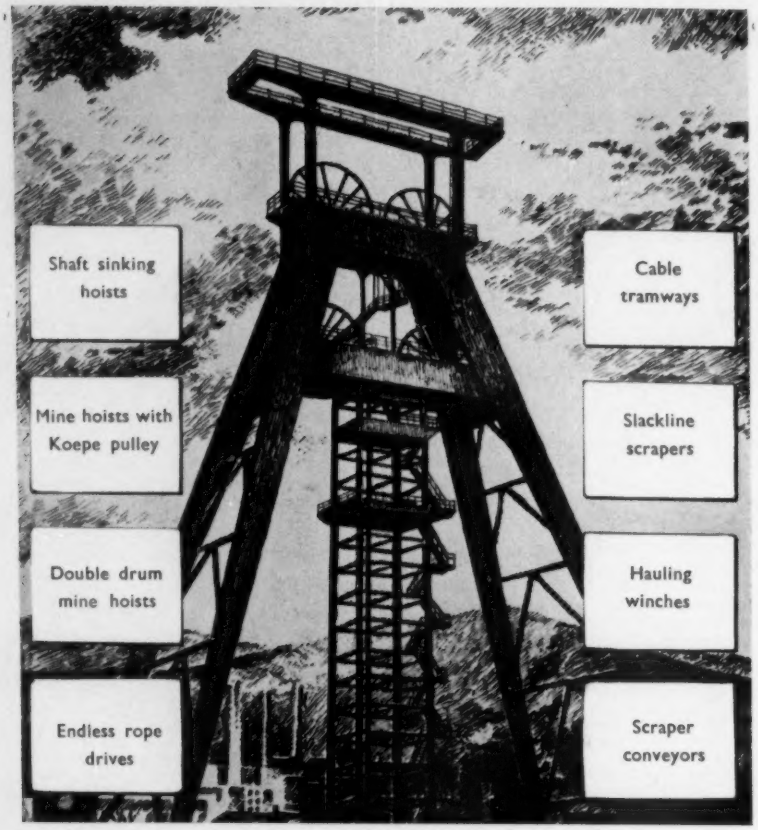

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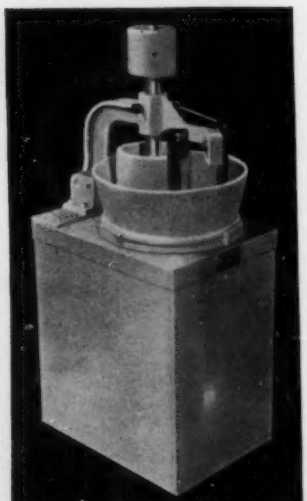

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West African Gold Production for April—June, 1958

Company	April-June 1958			Months since year end	Current Financial Year Total to date			Last Financial Year Total to date		
	Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)	Tons (000)	Yield (oz.)	Profit (£000)
A. Banket	180·0	41,698	92·0	9	552·7	128,185	343·1	517·9	103,901	209·6
Ariston	114·1	36,969	125·5	9	362·7	112,028	396·0	353·3	105,380	401·4
Ashanti	92·8	68,750	326·0	9	265·2	198,559	955·2	248·9	202,322	996·8
Bib. (1927)	103·5	20,700	12·0	9	297·0	60,900	56·3	270·0	58,400	75·9
Bremang*	2511·7	13,383	56·8	6	4956·5	27,137	119·5	3669·9	18,038	50·7
Ghana	34·0	12,559	38·0	12	138·1	49,215	158·4	142·3	46,486	145·4
Konongo	17·4	11,707	41·7	9	49·3	35,352	133·5	43·7	35,370	144·3

* Cu. yds. dredged.

South African and Rhodesian Coal Output for April—June, 1958

Company	3 months to June 30 (in tons)	Months since year end	Cumulative Totals (in tons)	
			This year to date	Last year to date
Amal. Coll. of S.A.	1,712,487	6	3,362,688	3,149,142
Apex	203,052	6	384,287	459,718
Blesbok	151,936	6	305,404	307,899
Coalbrook	629,643	6	1,225,554	1,002,630
Coronation	313,941	6	625,812	585,798
Natal Navigation	322,720	12	1,271,031	1,078,699
New Clydesdale	247,301	12	1,130,805	958,729
New Largo	348,752	6	651,527	600,618
S.A. Coal Estates	458,428	12	1,739,995	1,690,592
Springbok	325,928	6	631,605	432,463
Transvaal & Delagoa	377,277	10	1,232,987	1,161,573
Van Dyks Drift	157,922	6	329,686	321,620
Vierfontein	367,970	6	701,139	716,913
Vryheid Cor	162,260	6	318,190	315,429
Vryheid Cor*	123,253	6	244,520	245,676
Wankie	927,167	10	3,243,002	3,256,133
Wankie*	52,240	10	193,652	207,795
Witbank	420,410	6	811,879	880,735

* Coke

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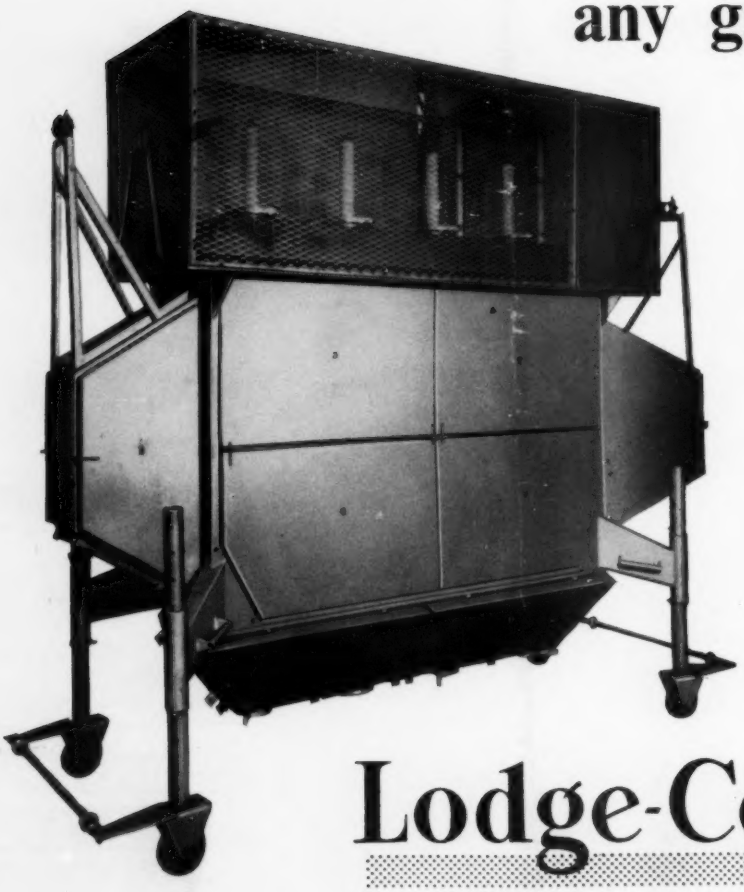

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